ROCKY MOUNTAIN ARSENAL

NORTHWEST BOUNDARY CONTAINMENT/TREATMENT SYSTEM

OPERATIONAL ASSESSMENT REPORT

FY88

FINAL REPORT

BY

TECHNICAL OPERATIONS DIVISION
PROGRAM MANAGER, ROCKY MOUNTAIN ARSENAL
COMMERCE CITY, COLORADO 80022-2180

DECEMBER 1989

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE 12/00/89	3. REPORT TYPE AND DATES COVERED

4. TITLE AND SUBTITLE
ROCKY MOUNTAIN ARSENAL, NORTHWEST BOUNDARY CONTAINMENT/TREATMENT SYSTEM, OPERATIONAL ASSESSMENT REPORT, FY88, FINAL REPORT

5. FUNDING NUMBERS

6. AUTHOR(S)
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ARMY ENGINEER WATERWAYS EXPERIMENT STATION

8. PERFORMING ORGANIZATION REPORT NUMBER
90061R02

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
ROCKY MOUNTAIN ARSENAL (CO.). PMRMA

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

THIS REPORT WAS PREPARED TO DOCUMENT AND ASSESS THE STATUS AND OVERALL OPERATIONAL PERFORMANCE OF THE NORTHWEST BOUNDARY CONTAINMENT/TREATMENT SYSTEM. IT COVERS THE PERIOD OCTOBER, 1987, THROUGH SEPTEMBER, 1988.

THE OBJECTIVES OF THE REPORT INCLUDE:

1. ASSESS THE CONTINUING EFFECTIVENESS OF THE NORTHWEST BOUNDARY SYSTEM IN PREVENTING OFF-POST MIGRATION OF CONTAMINATED GROUND WATER
2. DOCUMENT SYSTEM OPERATING PARAMETERS.

APPENDICES INCLUDE:

1. PLANT FLOW DATA
2. PLANT WATER QUALITY DATA
3. DEWATERING WELL DATA.

14. SUBJECT TERMS DEWATERING, WELL, GROUNDWATER			15. NUMBER OF PAGES 16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT

9006/R02

PREFACE

This study was conducted as part of a cooperative effort by personnel from the Technical Operations Division (TOD) of the Program Manager for Rocky Mountain Arsenal (PMRMA) and the U.S. Army Engineer Waterways Experiment Station (WES). Funding for participation by WES was provided by the PMRMA via Intra-Army Order No. 0489. Project management was provided by Messrs. David W. Strang, TOD, and Norman R. Francingues, WES Environmental Laboratory (EL) and James H. May, WES Geotechnical Laboratory (GL).

This study is the third operational assessment of the Northwest Boundary Containment/Treatment System at Rocky Mountain Arsenal (RMA). The contributing authors to this report were Messrs. Douglas W. Thompson, Jack H. Dildine, Norman R. Francingues (WES-EL), and Richard J. Lutton (WES-GL). The study and report were authorized by the Program Manager for Rocky Mountain Arsenal.

The authors acknowledge the support and assistance of the following people and organizations during this study: Mr. Jack Pantleo, Mr. Jim Clark, and Ms. Dianna Reynolds, D. P. Associates, and personnel of the Rocky Mountain Arsenal Information Center (RIC).

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CONVERSION FACTORS, U.S. CUSTOMARY TO METRIC (SI) UNITS OF MEASUREMENT

U.S. customary units of measurement used in this report can be converted to metric (SI) units as follows.

Multiply	By	To Obtain
acre	4046.873	square metres
cubic feet	0.02831685	cubic metres
feet	0.3048	metres
feet per mile (U.S. statute)	0.1893936	metres per kilometre
gallons (U.S. liquid)	3.785412	cubic decimetres
horsepower (550 foot-pounds (force) per second)	745.6999	watts
inches	2.54	centimetres
miles (U.S. statute)	1.609347	kilometres
pounds (mass) per cubic foot	16.01846	kilograms per cubic metre
square feet	0.09290304	square metres
square miles	2.589998	square kilometres

NORTHWEST BOUNDARY CONTAINMENT/TREATMENT SYSTEM OPERATIONAL ASSESSMENT REPORT FY88

PART I: INTRODUCTION

Background

1. The Northwest Boundary Containment/Treatment System Operational Assessment described herein has been prepared to document and evaluate the performance related to the boundary system operations. This report covers the system operating period of FY88.

2. Ground-water contamination problems have existed in the area of the Northwest boundary of Rocky Mountain Arsenal (RMA) since the mid 1950's, when investigations were conducted by the Army Corps of Engineers. In 1975, a ground-water surveillance program for RMA was established. This regional surveillance task included the monitoring of wells in the arsenal boundary areas. Since that time, several problem definition studies and design investigations have been conducted by RMA and the Corps of Engineers. Subsequently, a ground-water surveillance program was initiated in 1978 specifically for the Northwest boundary.

3. As a result of the ground-water investigations in 1980, several contaminants including DIMP, DBCP, chloride, endrin and dieldrin were detected in a narrow plume of ground water leaving RMA to the north and northwest. Additional studies by RMA and the Corps of Engineers lead to the design and construction of the Northwest Boundary Containment/Treatment System (NWBS) that was completed in October 1984 (Figure 1). This was the third boundary ground-water contamination control system constructed and operated at RMA.

4. This report incorporates by reference major system descriptions and previous operations described in the report entitled "Northwest Boundary Containment/Treatment System Baseline Conditions, System Startup and Operational Assessment Report for FY85/86" (PMRMA 1987). The reader is

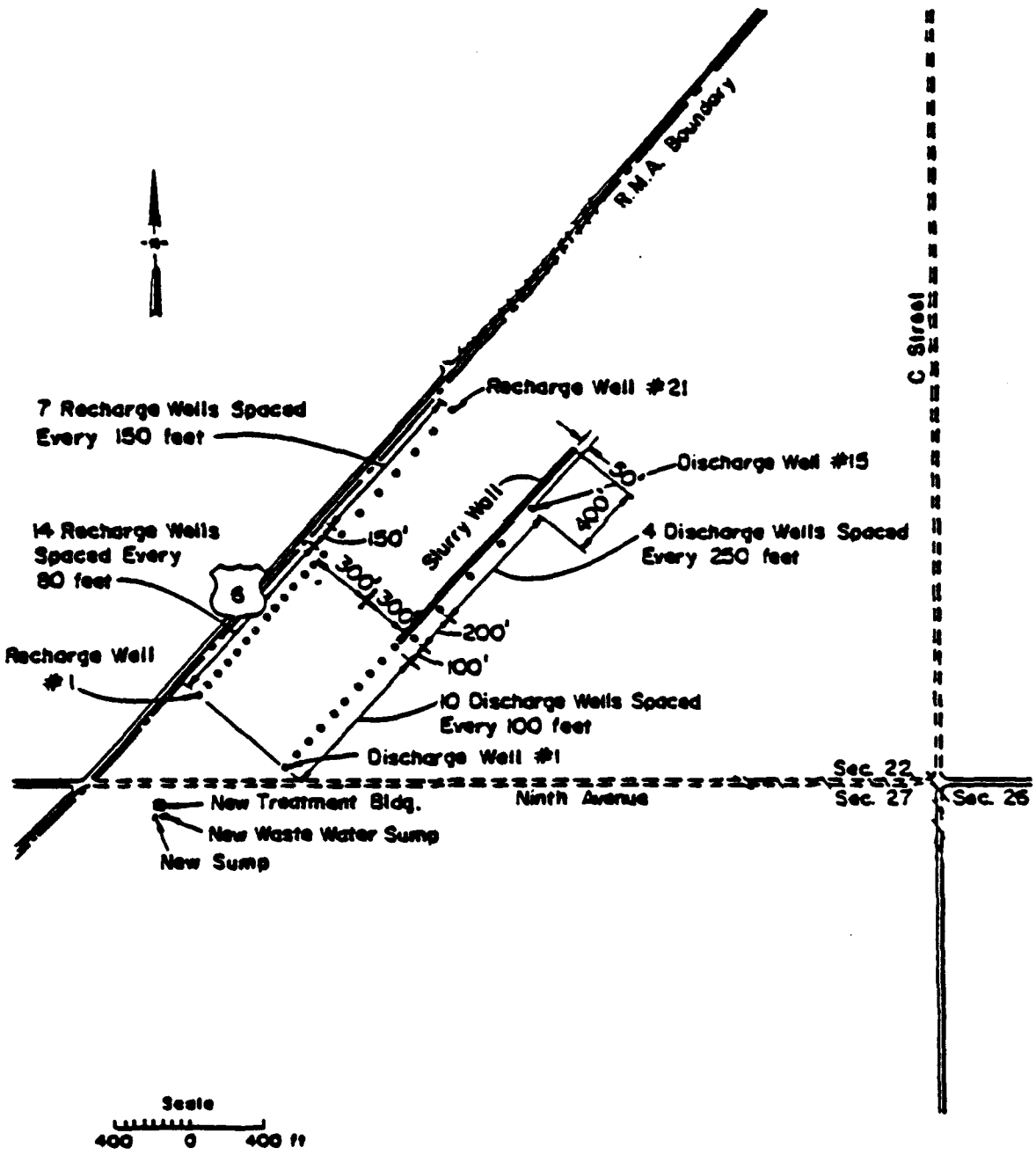


Figure 1. Northwest Boundary Containment/Treatment System layout map.

referred to the basic report for detailed information concerning a complete physical description of the system. The basic report is catalogued at the Rocky Mountain Arsenal Information Center (RIC) library and is document number 88054R01.

Report Objective

5. The objective of this report is to document the system operating parameters and performance during FY88. This report is primarily an environmental engineering assessment of the treatment plant operations.

Approach

6. The Technical Operations Division (TOD) at RMA provided the data base and general technical guidance. The U.S. Army Engineer Waterways Experiment Station (WES), Vicksburg, Mississippi, provided specialized environmental engineering assessments.

7. The study was conducted in three phases. Data were retrieved and organized by the TOD and RIC. The data bases were reviewed by WES for completeness prior to conducting various system performance evaluations. During the course of study, several in-progress reviews and coordination working sessions were held at the RMA, to facilitate exchange of information and to assure continuity and consistency in data interpretations and evaluations. Finally, the report was assembled from individual sections prepared by the various contributing authors.

PART II: PLANT OPERATIONS MONITORING

8. The treatment plant monitoring program continued in FY88. It included collection of data on flow rates through the system, and the quality of the water entering and leaving the plant. The flow rates were recorded on a daily basis.

9. Samples were taken weekly from the interior of the adsorbers for process control. These data were used to determine when (if necessary) to change carbon within the adsorber. The qualities of the plant's influent and effluent waters was monitored by taking water samples on a weekly basis and analyzing them. Samples were also collected and analyzed for the dewatering wells. These samples were collected from ports located in the well pits.

10. All water samples were collected in previously cleaned, glass containers, sealed, and transported to the appropriate analytical laboratory at RMA or their contractor for analysis. The parameters for which the plant samples were analyzed for during FY88 were presented in Table 1. All analyses were performed using standard methods. The sample analysis and flow data were entered into the analytical data base by laboratory personnel, subjected to a quality control routine, validated, and placed into the PMRMA data base by the RIC. Data sets were prepared for use in developing tables and figures. Copies of the plant flow and analytical data for FY88 are contained in Appendix A and Appendix B, respectively, of this report.

Table 1

Chemical Analysis of Treatment Plant Samples

Analyte	FY88 Quarters 1st	2nd	3rd	4th
Organochlorine Pesticides				
Aldrin	X	X	X	X
Endrin	X	X	X	X
Dieldrin	X	X	X	X
Isodrin	X	X	X	X
Hexachlorocyclopentadiene	X	X		
p,p'-DDE				X
p,p'-DDT	X	X		
Chlordane				X
Volatile Organohalogens				
Chlorobenzene	X	X		
Chloroform	X	X		
Carbon Tetrachloride	X	X	X	X
trans-1,2-Dichloroethylene				X
Trichloroethylene (TCE)	X	X	X	X
Tetrachloroethylene	X	X		
1,1 Dichloroethylene				X
1,1 Dichloroethane				X
1,2 Dichloroethane		X	X	
1,1,1 Trichloroethane				X
1,1,2 Trichloroethane				X
Methylene Chloride	X	X		
1,2 Dichloroethylene		X		
Organosulfur Compounds				
P-Chlorophenylmethylsulfone ($PCPMSO_2$)	X	X	X	X
P-Chlorophenylmethylsulfoxide (PCPMSO)	X	X	X	X
P-Chlorophenylmethylsulfide (PCPMS)	X	X	X	X
1,4-Dithiane	X	X	X	X
1,4-Oxathiane	X	X	X	X
Dimethyldisulfide (DMDS)				X
Benzothiazole	X	X		

(Continued)

Table 1 (Concluded)

Analyte	FY88 Quarters 1st	2nd	3rd	4th
DCPD/MIBK				
Dicyclopentadiene/	X	X	X	X
Methylisobutylketone				X
DIMP/DMMP				
Diisopropylmethylphosphonate/	X	X	X	X
Dimethylmethylphosphonate	X	X		
DBCP				
Dibromochloropropane	X	X	X	X
Inorganics				
Arsenic	X	X		
Chloride	X	X	X	X
Fluoride	X	X	X	X
Sulfate	X	X		
Volatile Aromatics				
Toluene	X	X		
Benzene	X	X		
Xylene (o-, m-, p-)	X	X		
Ethylbenzene	X	X		
GC/MS Analysis		X		

PART III: SYSTEM OPERATIONS

Operations Summary

11. A record of plant operations for the NWBS is maintained by RMA plant operating personnel with major events documented on a daily basis. The daily record contains information on the operations, maintenance activities, and repair of the treatment plant equipment and dewatering and recharge wells. The record also details other events such as plant downtime, equipment failure, and filter and carbon removal and replacement.

12. The operations and performance of the Northwest Boundary System were very good in FY88 with only minor downtime for repair being reported. In the 2nd quarter of FY88, the plant was shut down for 8 hours on January 22, 1988, because of excessive adsorber recycling or surging. The cause of the restricted flow to the recharge wells was attributed to plugged filters. On August 8, 1988, the system was down again for pipe repairs and to empty the effluent sump for maintenance. Scheduled maintenance was performed from August 8 to August 10 and the NWBS was out of operation for a total of 48 hours and 40 minutes. A variety of electrical maintenance and repair tasks were performed on the dewatering wells during this timeframe. There were no major physical alterations to the NWBS during FY88.

System Flow Quantities

13. The volume of water processed by the NWBS is recorded on a daily basis. The flow data recorded for FY88 are presented in tables in Appendix A of this report. Graphs of weekly flow data for each adsorber and the effluent have been prepared and are presented in Figures 2 through 5. The treatment plant flow data were recorded on a weekly (7 day) basis beginning with the first day of the FY and continuing through the end of the FY.

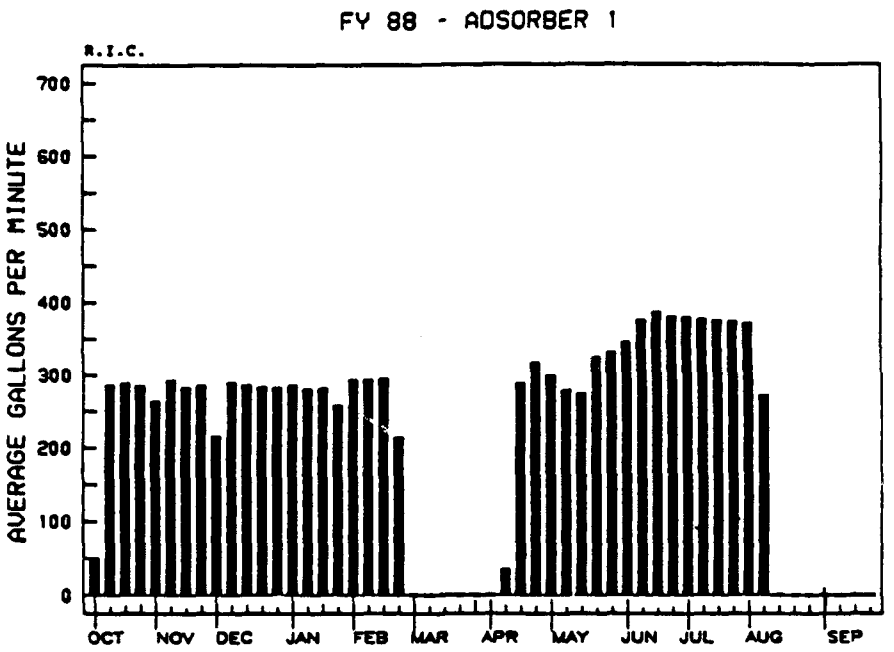


Figure 2. Adsorber 1 flow rate during FY88.

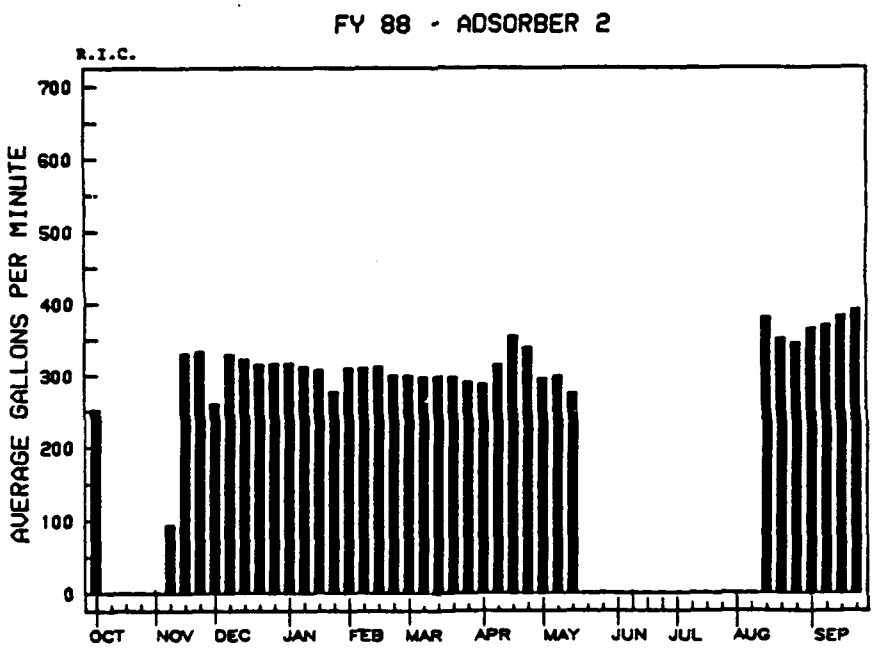


Figure 3. Adsorber 2 flow rate during FY88.

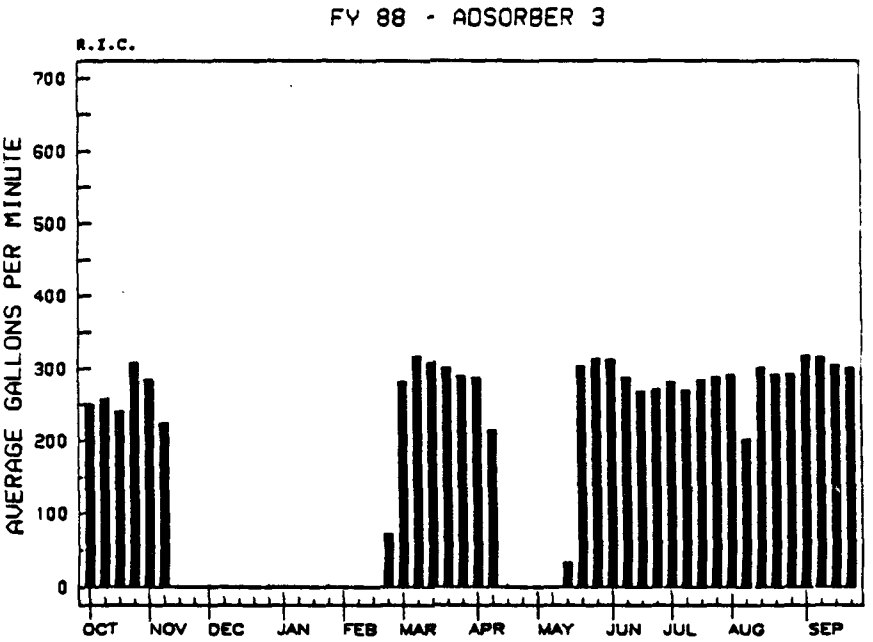


Figure 4. Adsorber 3 flow rate during FY88.

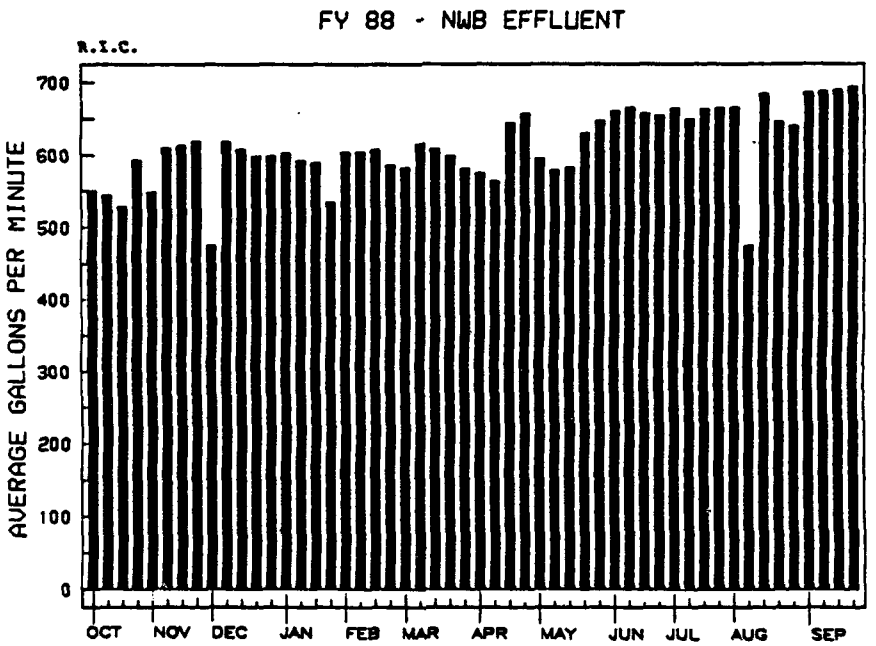


Figure 5. Effluent flow rate during FY88.

14. Periods of no flow were experienced by each of the adsorbers during various times of the year (see Figures 2-5). The optimal dewatering/recharge rate can be maintained using two adsorbers in parallel with the third adsorber being maintained in a standby status. During FY88, the total system flow rate (effluent) ranged from a low of 475 gpm to a high of approximately 694 gpm. A management decision was made to increase the flow through the plant in the last quarter of FY88. The flow was increased so that recharge could be increased at the northern end of the system thus raising groundwater levels downstream of the barrier in an effort to achieve a reverse gradient across the barrier. Average adsorber and total flow rates and total gallons of water treated during FY88 are presented in Table 2. The total volume treated in FY88 was approximately 62.6 million gallons more than that treated in FY87. The average flow rate in FY88 was approximately 116.6 gpm greater than that for FY87.

Table 2

FY 88 System Flow Quantities

Adsorber	Average Flow Rate (gpm)	Total Volume Treated (gal)
1	218.99	114,817,000
2	216.07	114,373,000
3	176.77	93,541,000
Total Effluent	611.83	322,731,000

System Influent and Effluent Water Quality

15. The quality of the influent and effluent from the treatment system is monitored periodically by taking grab samples and analyzing them. A single sample was collected from the influent sump to determine the quality of water flowing to the adsorbers. A single sample was collected from the effluent sump after treatment.

16. The influent and effluent samples were analyzed for the contaminants listed in Table 1 of this report. A statistical summary of the chemical analysis data for the period October 1987 through September 1988 are presented in tabular form in Appendix B of this report. As indicated in the statistical summary in Appendix B, a variety of analytes had different CRL's during the year. This situation developed due to the use of a variety of labs during the year. Analyses were conducted by ESE until February, RMA Laboratory Group until April, and Datachem thereafter. Each lab had its own CRL for the method used. Graphs of the concentrations found for endrin, dieldrin, chloroform, 1,2 dichloroethane, DCPD, DIMP, DBCP, chloride, fluoride, and sulfate, over the reporting period (FY88) have been constructed and are presented in Figures 6 through 15. No concentrations of the other contaminants analyzed for in Table 1 in excess of their respective certified reporting limits were found in the samples collected during FY88. Therefore, no graphs were constructed for these undetected contaminants.

17. A separate graph has been constructed for each contaminant detected in the plant influent and effluent. Each graph presents a plot of the contaminant concentration reported and three lines indicating the certified reporting limit (CRL), the maximum operating limit (MOL) permitted, and the average concentration over the FY where sufficient data above CRL were available to calculate an average. The MOL used in this report is defined as the water quality criterion against which the operating performance of the treatment plant is compared in order to assess treatment effectiveness for the various contaminants of concern. A list of the MOL's used during the FY88 operational assessment is presented in Table 3. An average concentration was only computed for sets of data where 70 percent or more of the readings were above the CRL. When the criterion was met, values falling below the CRL were made equal to the CRL and included in the computations.

18. A GC/MS analysis was conducted on a set of samples collected in January 1988. The results of the analysis are presented in Appendix B. Only chloroform was found above its respective detection level in the influent sample. Chloroform is being monitored on a periodic basis. No contaminants were found in the effluent sample.

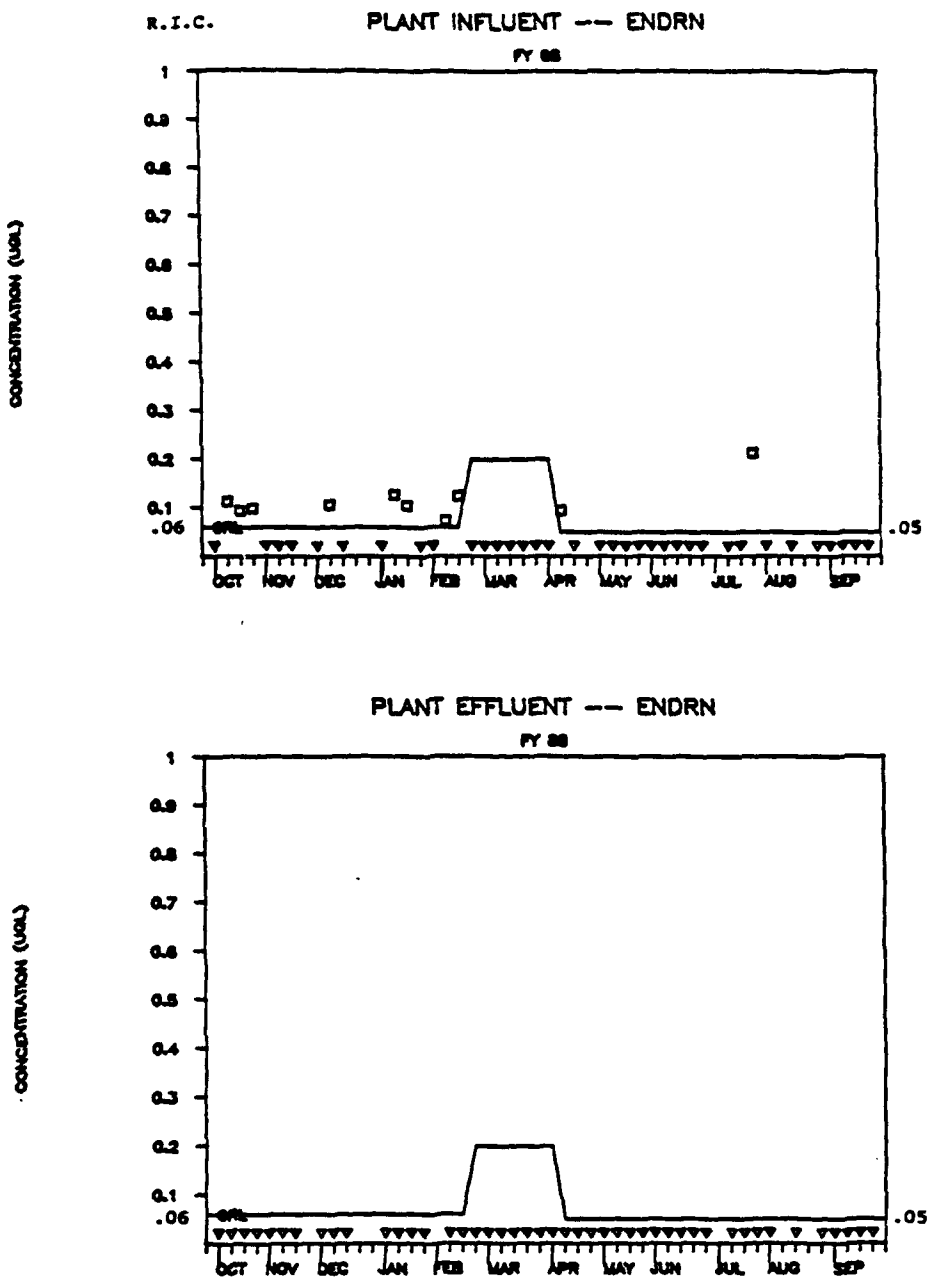


Figure 6. FY88 Endrin.

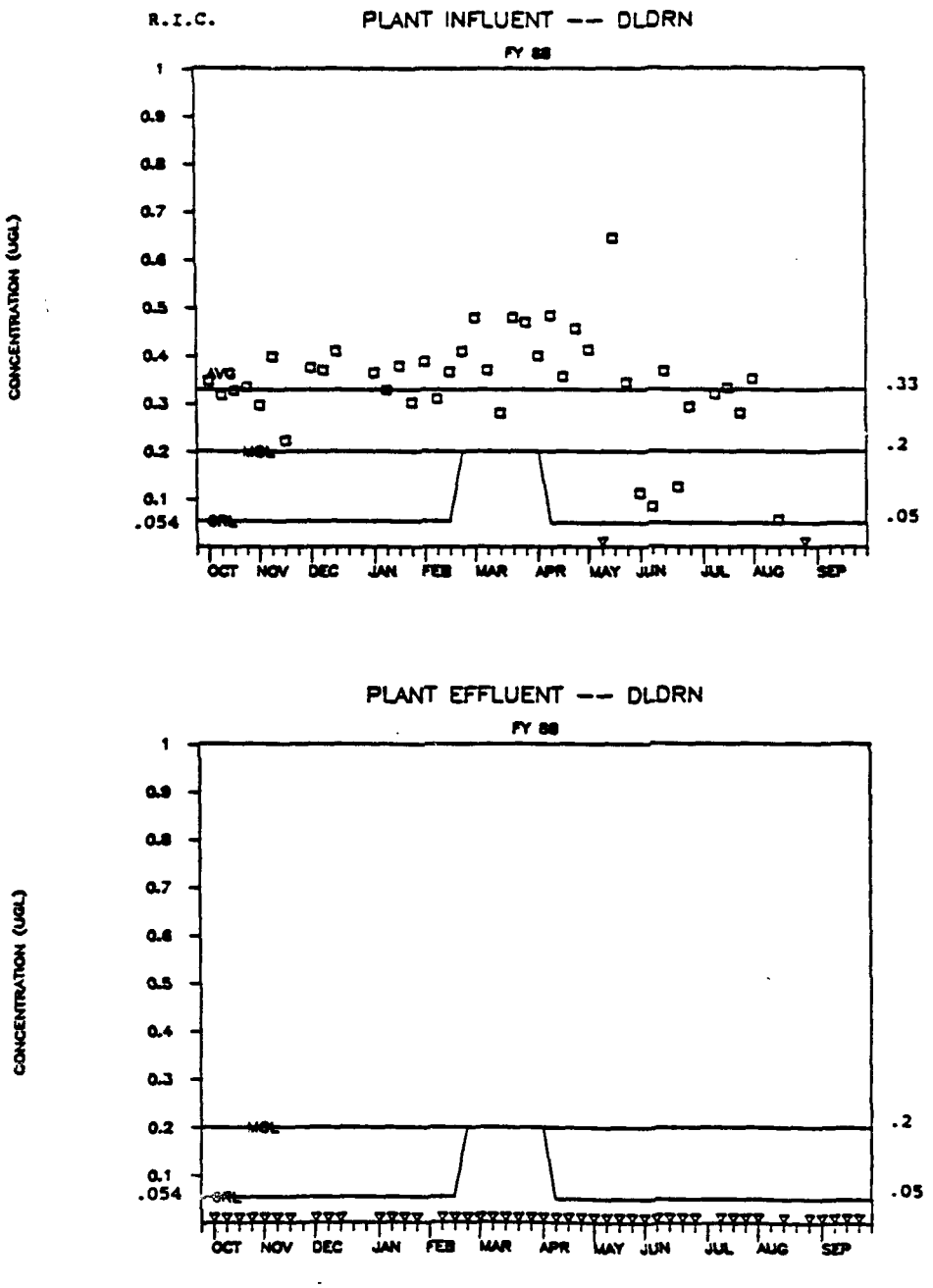


Figure 7. FY88 Dieldrin.

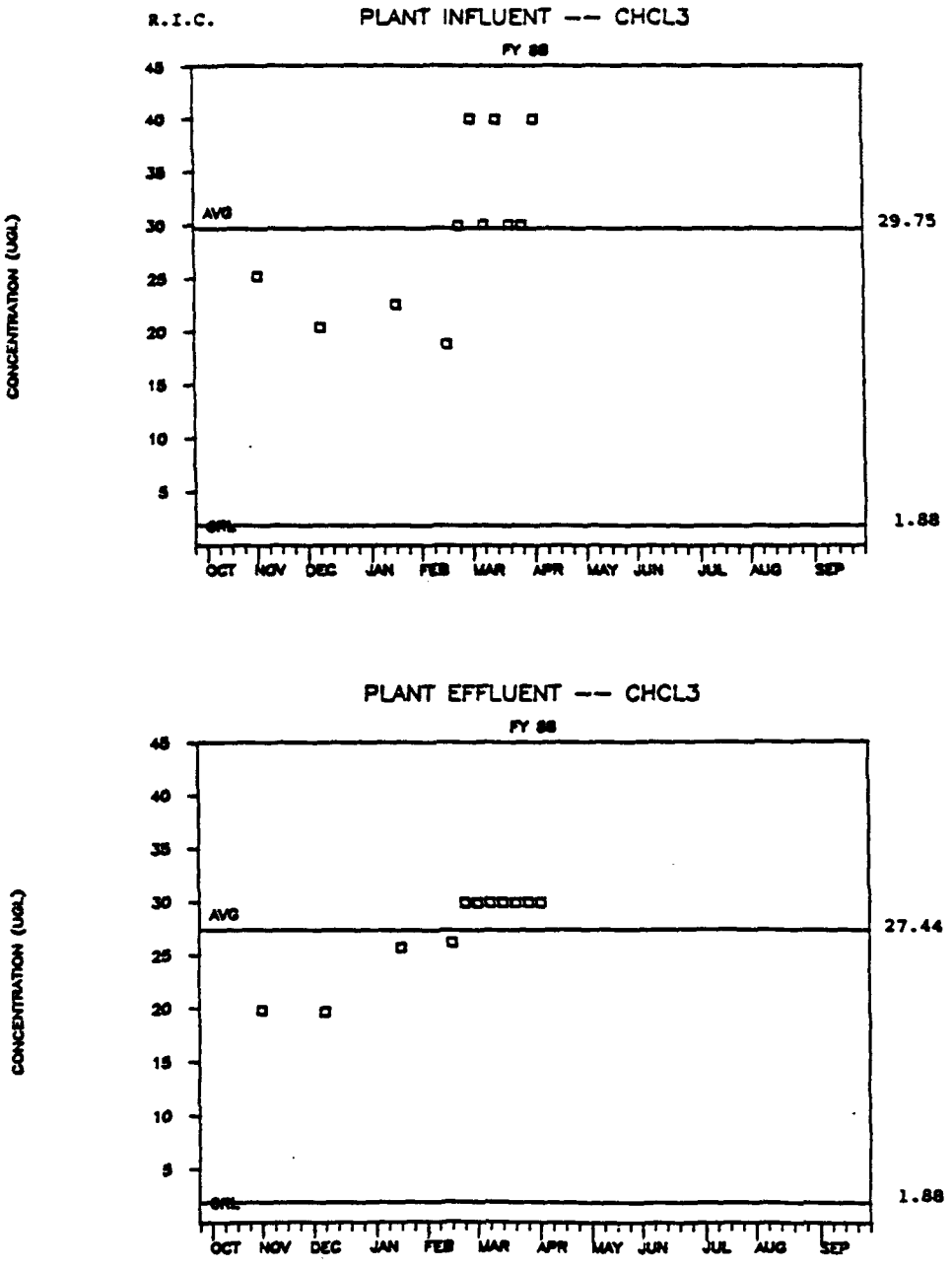


Figure 8. FY88 Chloroform.

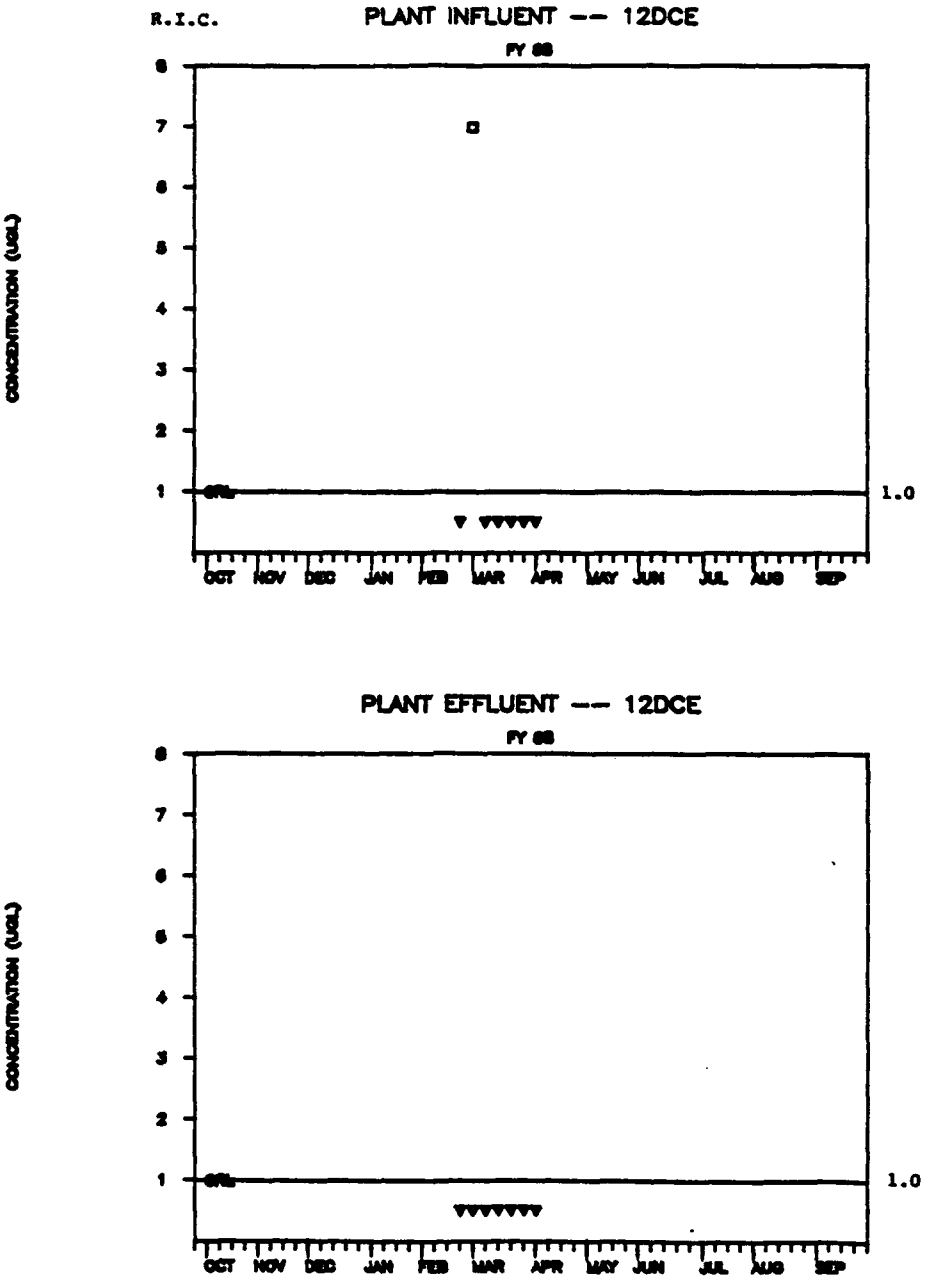


Figure 9. FY88 1,2 Dichloroethylene.

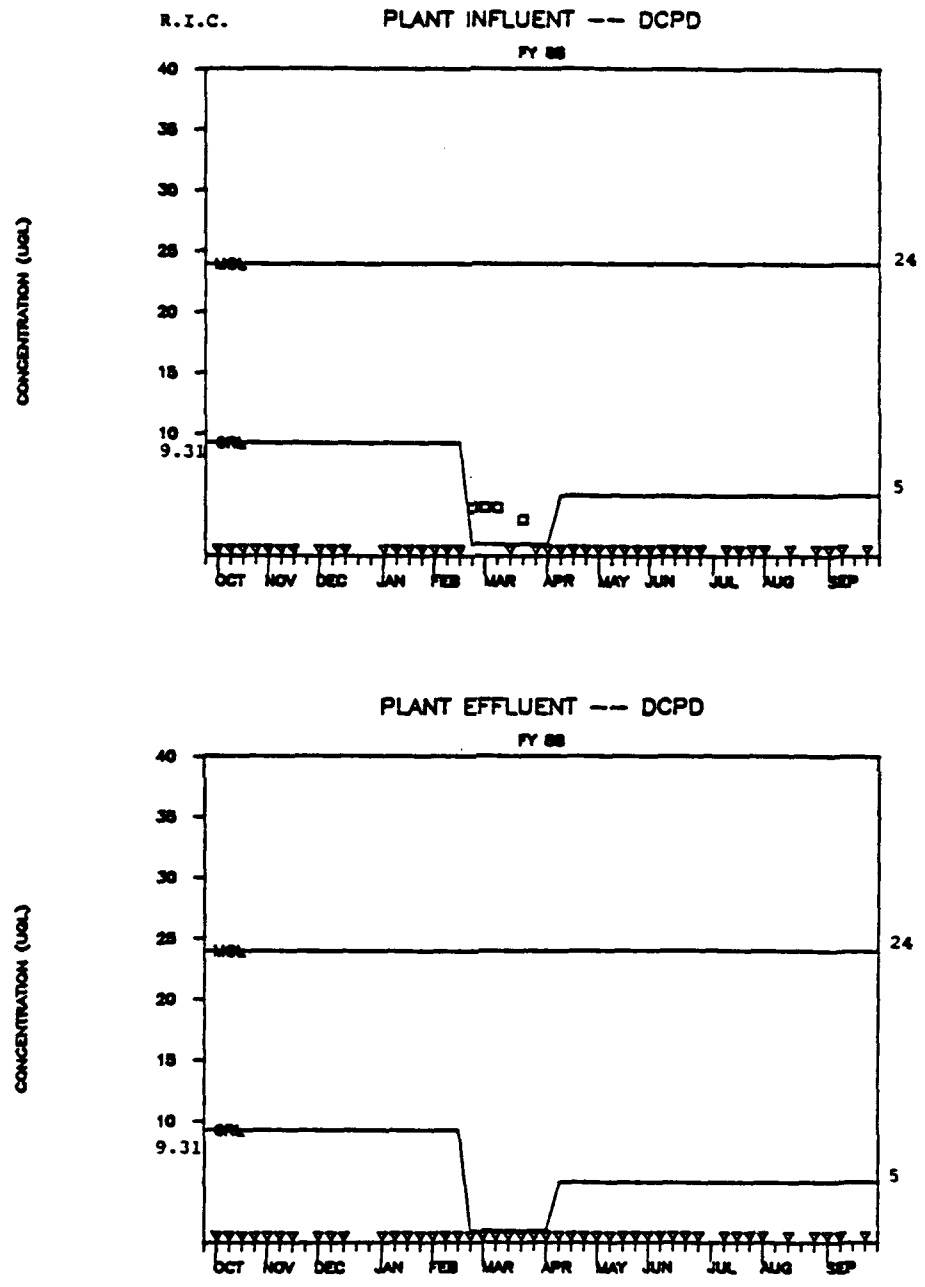


Figure 10. FY88 Dicyclopentadiene.

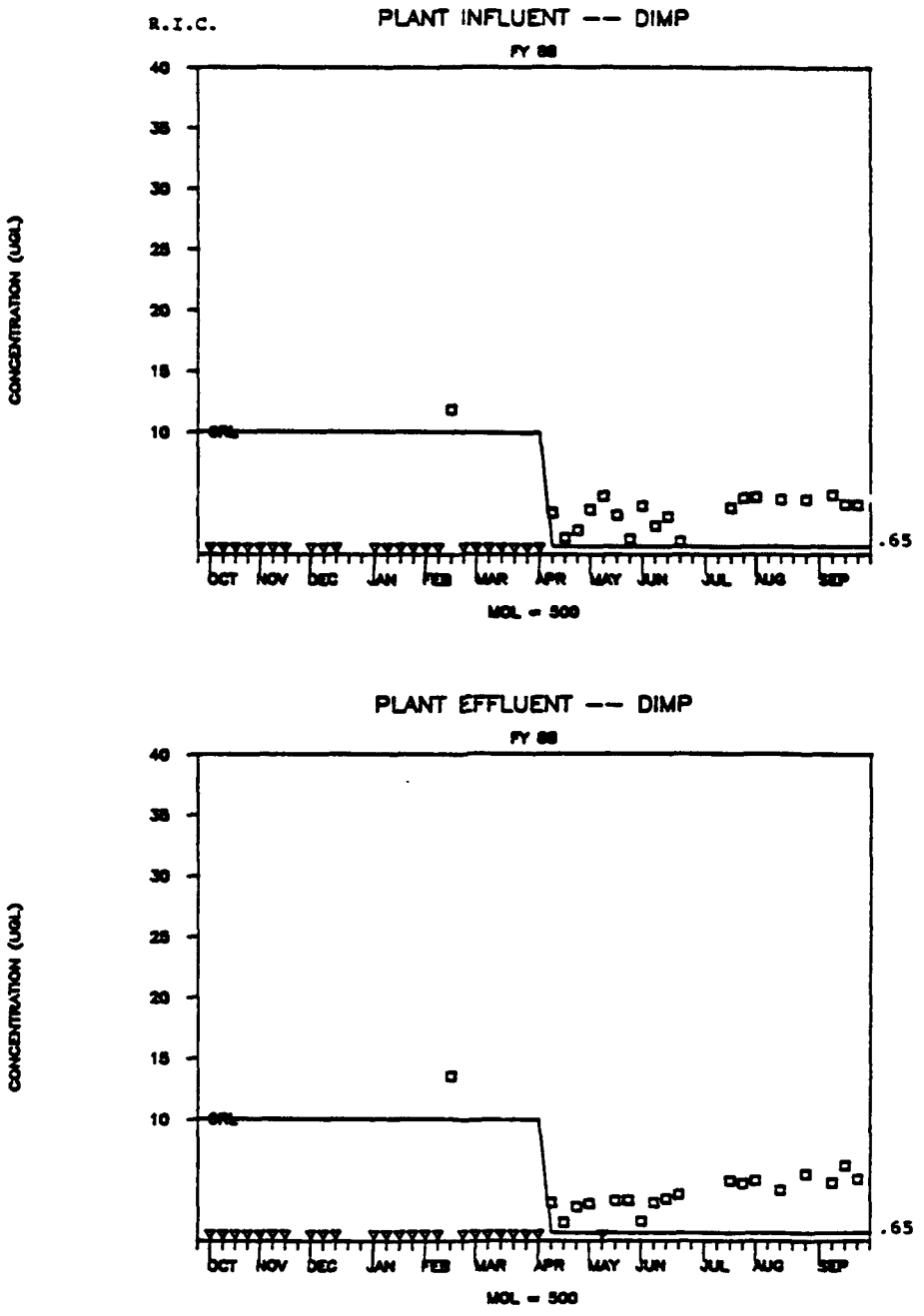


Figure 11. FY88 Diisopropylmethylphosphonate.

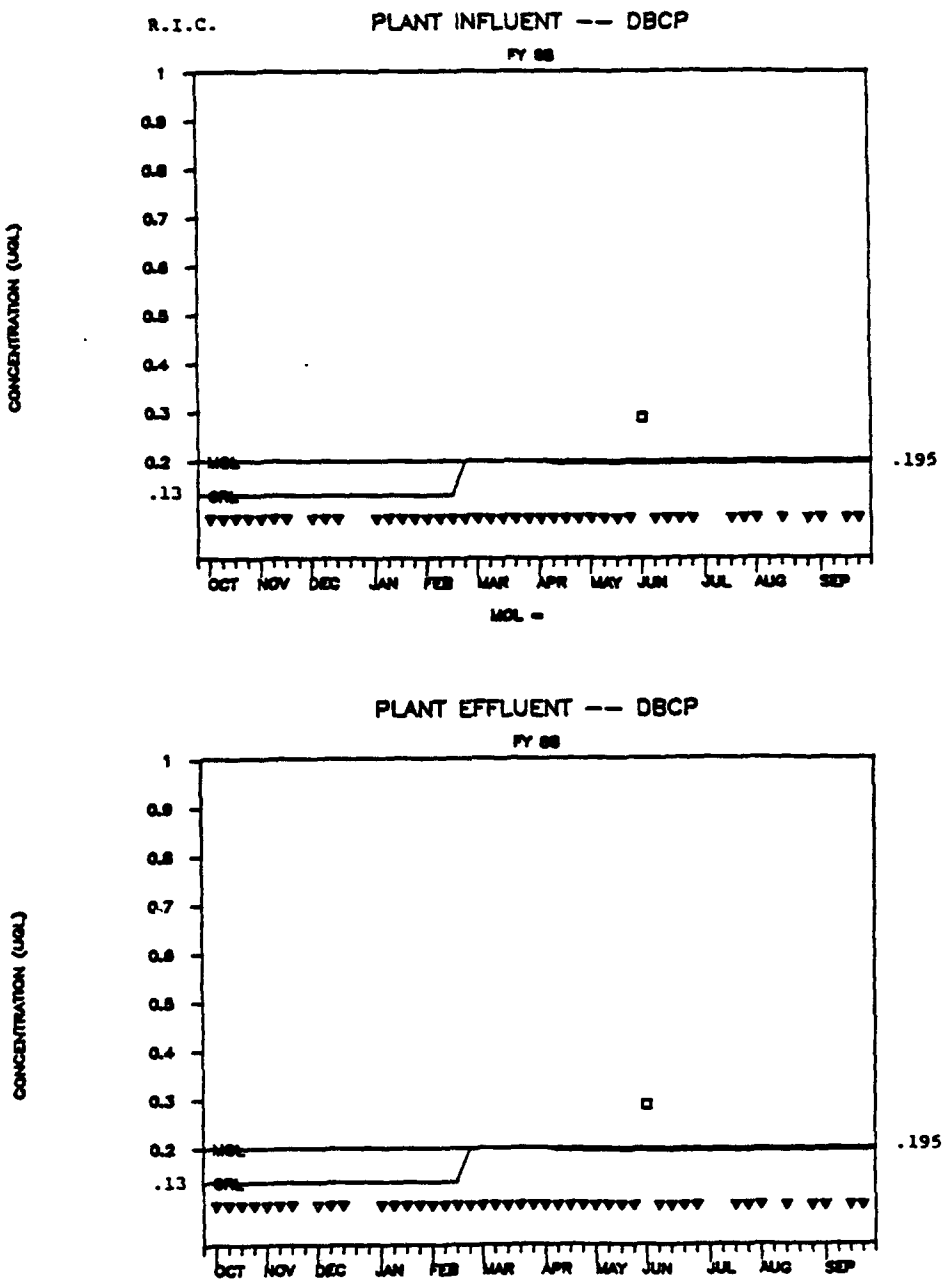


Figure 12. FY88 Dibromochloropropane.

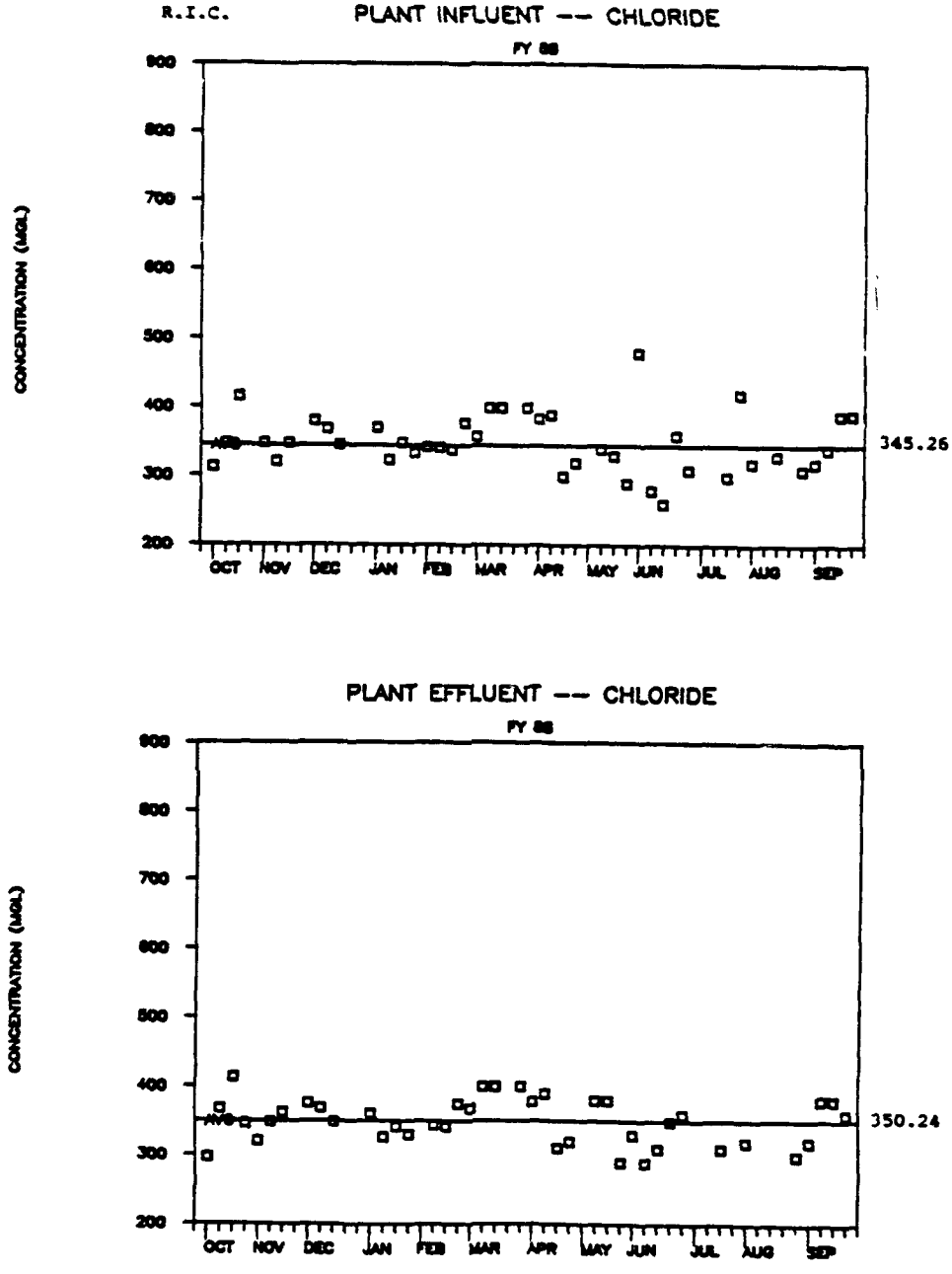


Figure 13. FY88 Chloride.

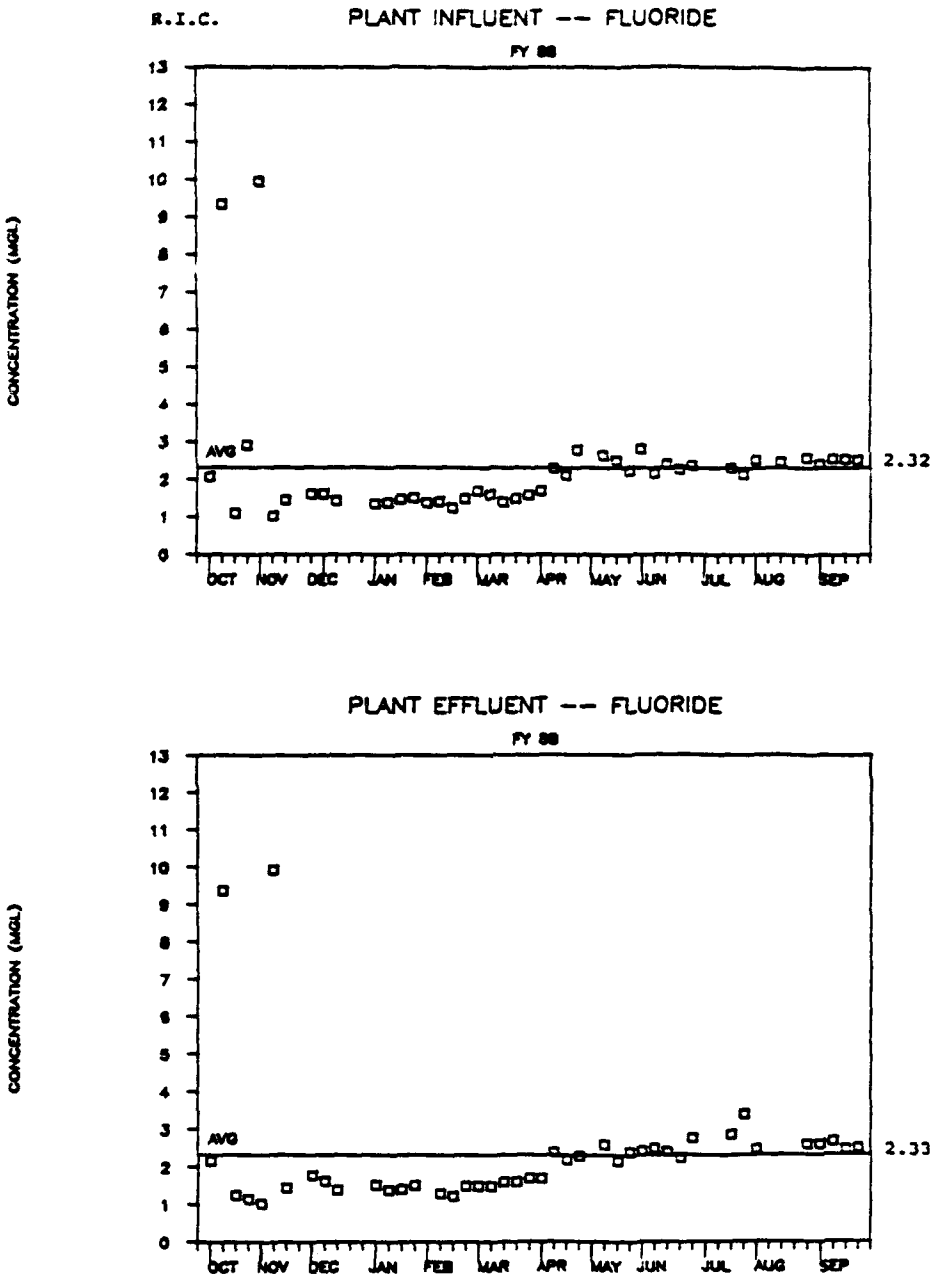


Figure 14. FY88 Fluoride.

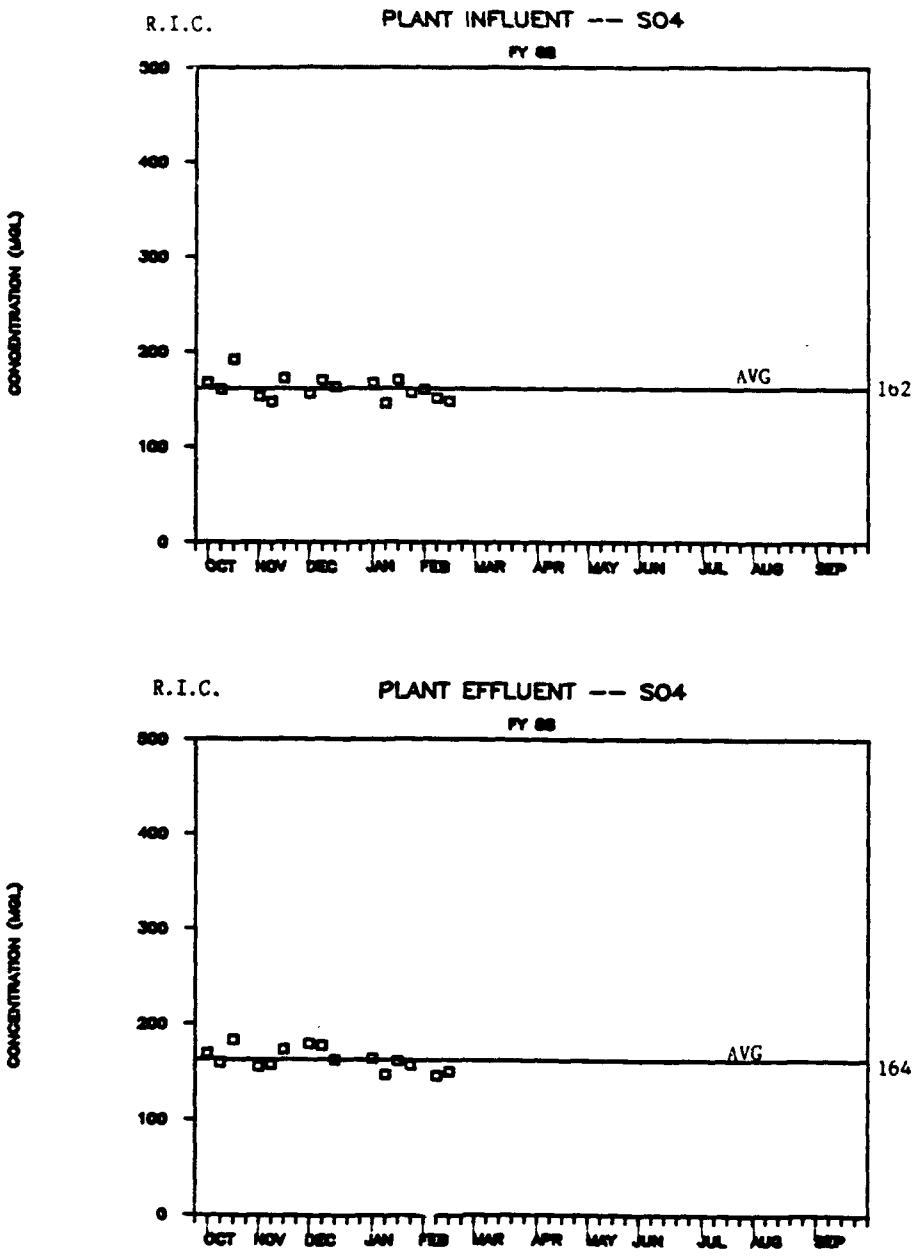


Figure 15. FY88 Sulfate.

Table 3

Maximum Operating Limits for Northwest Boundary System

Parameter	Maximum Operating Limit (MOL)	Source*
Aldrin	0.2 $\mu g/\ell$	Guidance from OTSG (Army) until standards are developed.
Chloride	N.A.	EPA Secondary Drinking Water Regulation standard is 250 mg/ℓ
Dibromochloropropane (DBCP)	0.2 $\mu g/\ell$	State of Colorado Department of Health limit per letter to Commander, RMA, 26 June 79.
Dicyclopentadiene (DCPD)	24.0 $\mu g/\ell$	The State of Colorado has requested the Army to meet a limit of 24 $\mu g/\ell$ for DCPD based on an odor threshold value.
Diisopropylmethyl-phosphonate (DIMP)	500 $\mu g/\ell$	These criteria are recommended by the US Medical Bioengineering Research and Development Lab (26 Aug 76) and are based on toxicology studies (26 Aug 76) conducted by the Army. The National Academy of Sciences Committee on Military Environmental Research has reviewed the procedures and results of toxicology studies and concurred in the drinking water levels (1 Feb 77).
Dieldrin	0.2 $\mu g/\ell$	Guidance from OTSG (Army) until standards are developed.
Endrin	0.2 $\mu g/\ell$	EPA National Primary Drinking Water Regulation.
Fluoride	N.A.	EPA final Rule on Fluoride, National Primary and Secondary Drinking Water Standards, 40 CFR Parts 141, 142, and 143, maximum concentration limit is 4.0 mg/ℓ.

N.A. = Not Applicable

* Source: After Rocky Mountain Arsenal Contamination Control Program Management Team (1983)

Endrin

19. The CRL for endrin (Figure 6) in FY88 was 0.06 ppb until the middle of February 1988 when it was raised to 0.20 ppb. Beginning in April 1988, the CRL was lowered to 0.05 ppb. The MOL for the NWB treatment plant was 0.2 ppb. A single sample of the plant influent collected in FY88 was found to contain endrin above the CRL at approximately 0.213 ppb. No concentrations above the CRL were found in the plant effluent.

Dieldrin

20. The CRL for dieldrin (Figure 7) in FY88 was 0.054 ppb until the middle of February 1988 when it was raised to 0.20 ppb. Beginning in April 1988, the CRL was lowered to 0.05 ppb. The MOL for the NWB treatment plant was 0.2 ppb. The concentrations of dieldrin found in the plant influent ranged from the CRL to approximately 0.65 ppb. The average concentration for FY88 was 0.33 ppb. No concentrations above the CRL were found in the plant effluent.

Chloroform

21. The CRL for chloroform (Figure 8) in FY88 was 1.88 ppb. No MOL was established. The concentrations of chloroform found in the plant influent ranged from a low of 18.9 ppb to a high of 40 ppb with the highest concentration found during the 2nd and 3rd quarters. The average concentration for FY88 was 29.75 ppb. The concentration found in the plant effluent ranged from a low of 19.8 ppb to a high of 30 ppb with an average for the year of 27.24 ppb. Chloroform is not effectively adsorbed by activated carbon unlike many of the other organic contaminants found in the ground water at RMA. The NWB treatment plant removed only an average of 8.4 percent of the chloroform in the influent stream.

1,2 Dichloroethane

22. The CRL for 1,2 dichloroethane (Figure 9) in FY88 was 1.0 ppb. No MOL was established. The concentrations of 1,2 dichloroethane found in the plant influent ranged from below the CRL to a single high of 7.0 ppb. The single concentration above the CRL was found during the 2nd quarter. No concentrations above the CRL were found in the plant effluent.

DCPD

23. The CRL for DCPD (Figure 10) in FY88 was 9.31 ppb until the middle of February 1989 when it was decreased to 1.0 ppb. Beginning in April 1988, the CRL was increased to 5.0 ppb. The MOL for the NWB treatment plant was 24 ppb. The concentrations of DCPD found in the plant influent ranged from less than the CRL to a high of 4.0 ppb. No samples of the effluent contained concentrations above the CRL during FY88.

DIMP

24. The CRL for DIMP (Figure 11) in FY88 was 10.0 pb until April 1988 when it was reduced to 0.65 ppb. The MOL for the NWB treatment plant was 500 ppb. Twenty samples of the plant influent collected in FY88 were found to contain DIMP concentrations above the CRLs with a high of 11.9 ppb. Nineteen DIMP values for the plant effluent were reported above the CRLS, with the highest being 13.6 ppb in the 2nd quarter. No values were above the MOL. The influent value of 11.9 ppb and effluent value of 13.6 ppb appear to anomalous values since they are much higher than any other values found during the year. DIMP concentrations in the effluent exhibited a slight increasing trend over the last half of the year.

DBCP

25. The CRL for DBCP (Figure 12) in FY88 was 0.13 until the middle of February when it was raised to 0.195 ppb. The MOL for the NWB treatment plant was 0.2 ppb. A single sample of the plant influent collected in FY88 was found to contain DBCP above the CRL at 0.289 ppb. A single sample of plant effluent was found to contain DBCP above the CRL and the MOL at 0.289 ppb. This value was identical to the influent sample concentration taken on the same day. This value appears to be anomalous.

Chloride

26. The CRL for chloride (Figure 13) was not reported. The concentrations of chloride found in the plant influent ranged from 154 ppm to 480 ppm with an average for the year of 345 ppm. The concentrations found in the plant effluent ranged from 290 ppm to 413 ppm with an average for the year of 350 ppm. These averages are

statistically the same. As evidenced by the data, chloride is not removed from the ground water by the activated carbon treatment system.

Fluoride

27. The CRL for fluoride (Figure 14) was not reported. The concentrations of fluoride found in the plant influent ranged from 1.02 pm to 9.95 ppm with an average for the year of 2.32 ppm. The concentrations found in the plant effluent ranged from 1.02 pm to 9.94 ppm with an average for the year of 2.33 ppm. These averages are statistically the same. Fluoride is also not removed from the ground water by the activated carbon treatment system. The high values for fluoride are somewhat suspicious since they are much greater than those reported in previous studies.

Sulfate

28. The CRL for sulfate (Figure 15) was not reported. The concentrations of sulfate found in the plant influent ranged from 146 ppm to 193 ppm with an average for the year of 162 ppm. The concentration found in the plant effluent ranged from 147 ppm to 184 ppm with an average for the year of 164 ppm. These averages are statistically the same. Sulfate is not removed from the ground water by the activated carbon treatment system.

Carbon Usage

29. Carbon usage in the NWBS treatment plant is very low compared to the North Boundary System treatment plant, due to the lower total mass of contamination being removed. No carbon was added to any of the other adsorbers during FY88. Only single time addition of 1500 pounds of fresh carbon has been needed over the FY87-88 time frame. No carbon was added to any of the other adsorbers during FY88. Thus, it was not possible to calculate a realistic carbon usage rate for the NWBS treatment plant, based solely on this single event.

Contaminant Concentrations in Dewatering Wells

30. In order to provide a picture of the distribution of contaminants in the ground water near the NWBS, contaminant concentrations found associated with each alluvial dewatering well were plotted with respect to the well number along the dewatering well line; thus, each graph provides a visual representation of a particular contaminant distribution along the length of the system. Based on the availability of data, graphs were developed only for aldrin, chloride, DBCP, DCPD, DIMP, dieldrin, endrin, and fluoride for FY88. These graphs are presented in Figures 16 through 23. Each graph presents the data collected for each well during the year. The vertical lines associated with each well number represent the range of concentrations found (maximum and minimum) with the mean value for each well connected by a dotted line. A mean value was only computed for sets of data where 70 percent or more of the readings were above the CRL. When this criterion was met, values falling below the detection limit were made equal to the detection limit or CRL and included in the computations. A single triangle indicates that all values were below the detection limit or CRL. A statistical summary of all the data used to develop the graphs is presented in Appendix C. It should be noted that the maximum number of samples collected from each well was two with only one sample collected in many cases.

Aldrin

31. During FY88, concentrations of aldrin (Figure 16) above the CRL were found in samples collected from dewatering wells on the northeast end of the control system. The maximum concentration found was 0.14 ppb in Well No. 14.

Chloride

32. The highest concentrations of chloride (Figure 17) during FY88 were found along the northeast end of the control system. The maximum concentration of approximately 900 ppm was found in a sample from Well No. 14. The maximum mean concentration was approximately 730 ppm in Well No. 14. The chloride concentration decreased from northeast to southwest along the system with concentrations of 250 ppm found in samples from the southwest end (Figure 17).

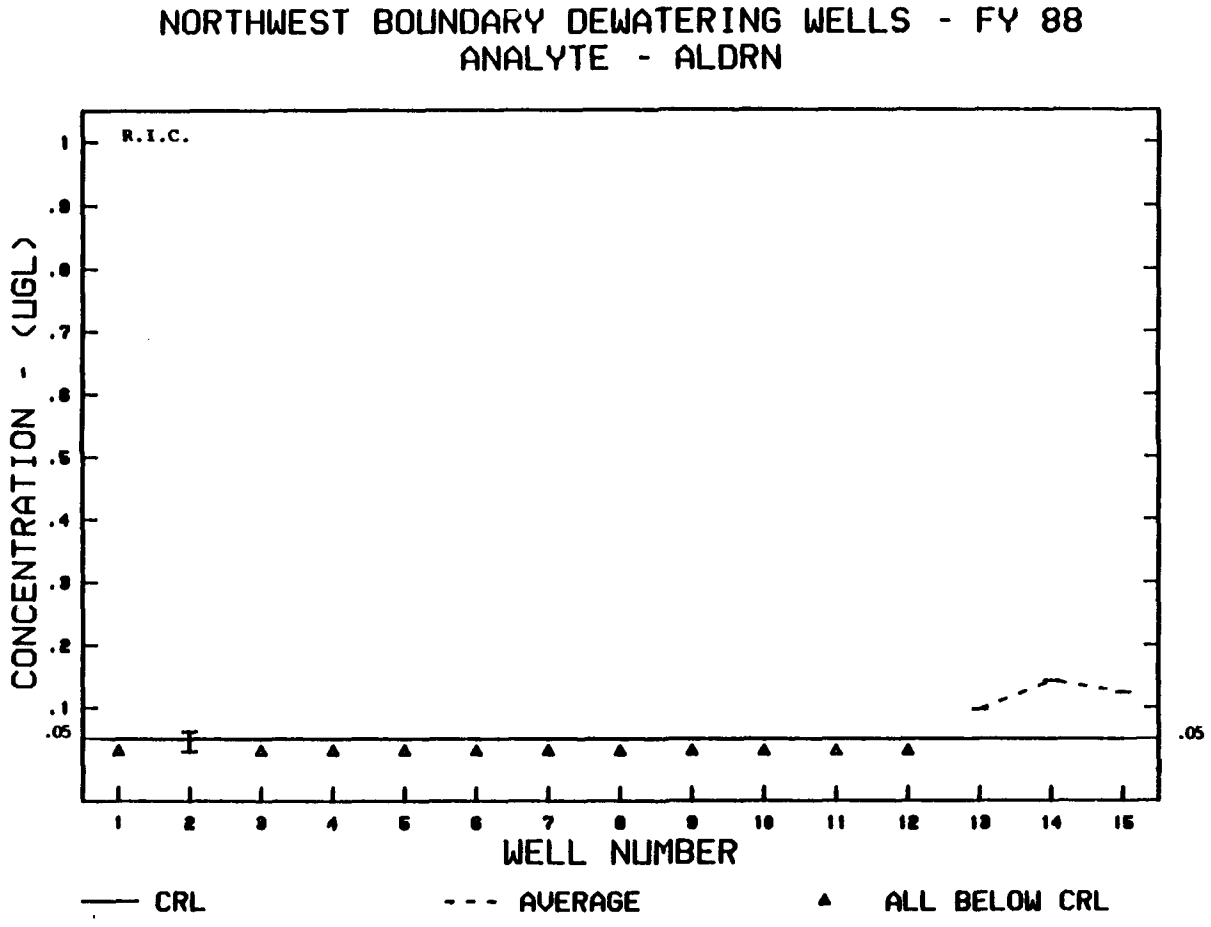


Figure 16. Aldrin concentrations in northwest boundary dewatering wells, FY88.

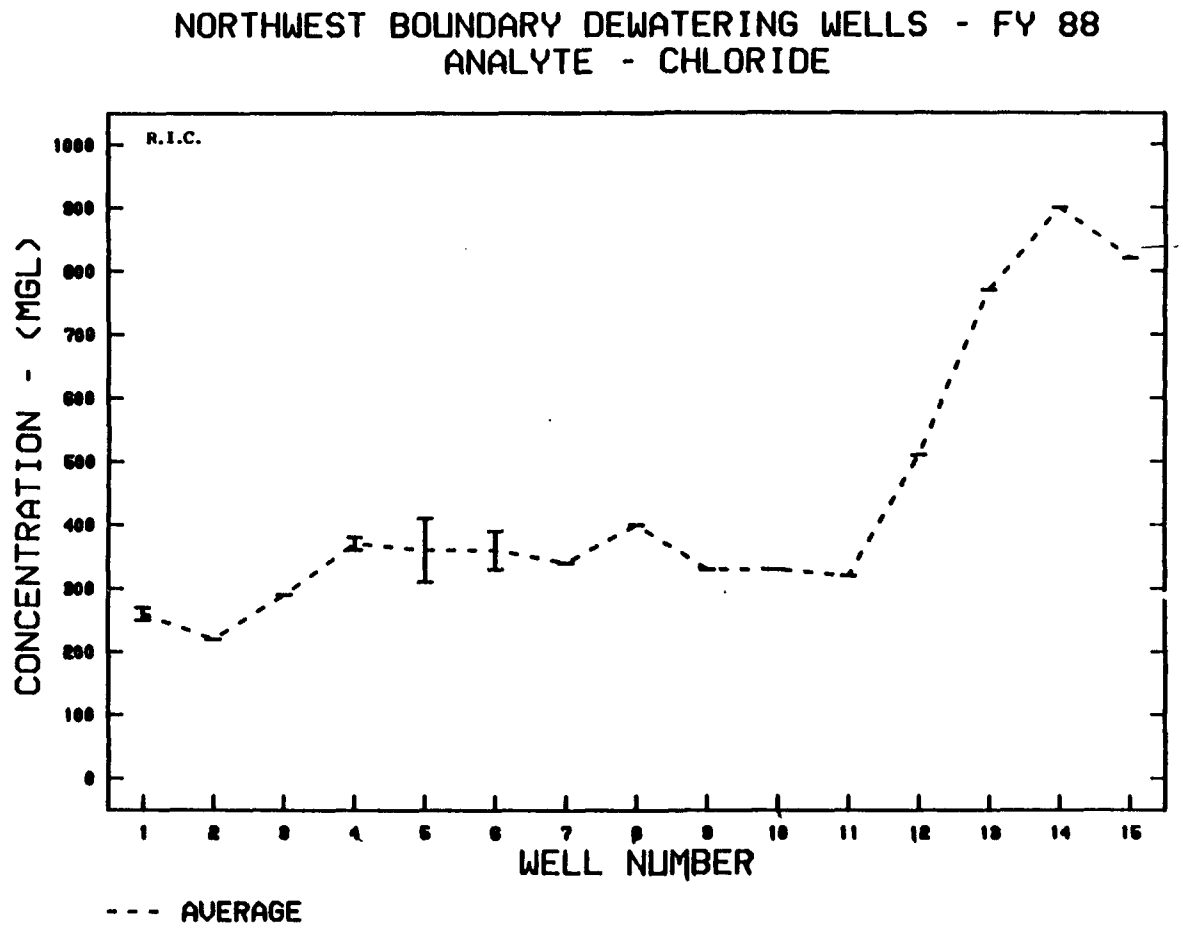


Figure 17. Chloride concentration in northwest boundary dewatering wells, FY88.

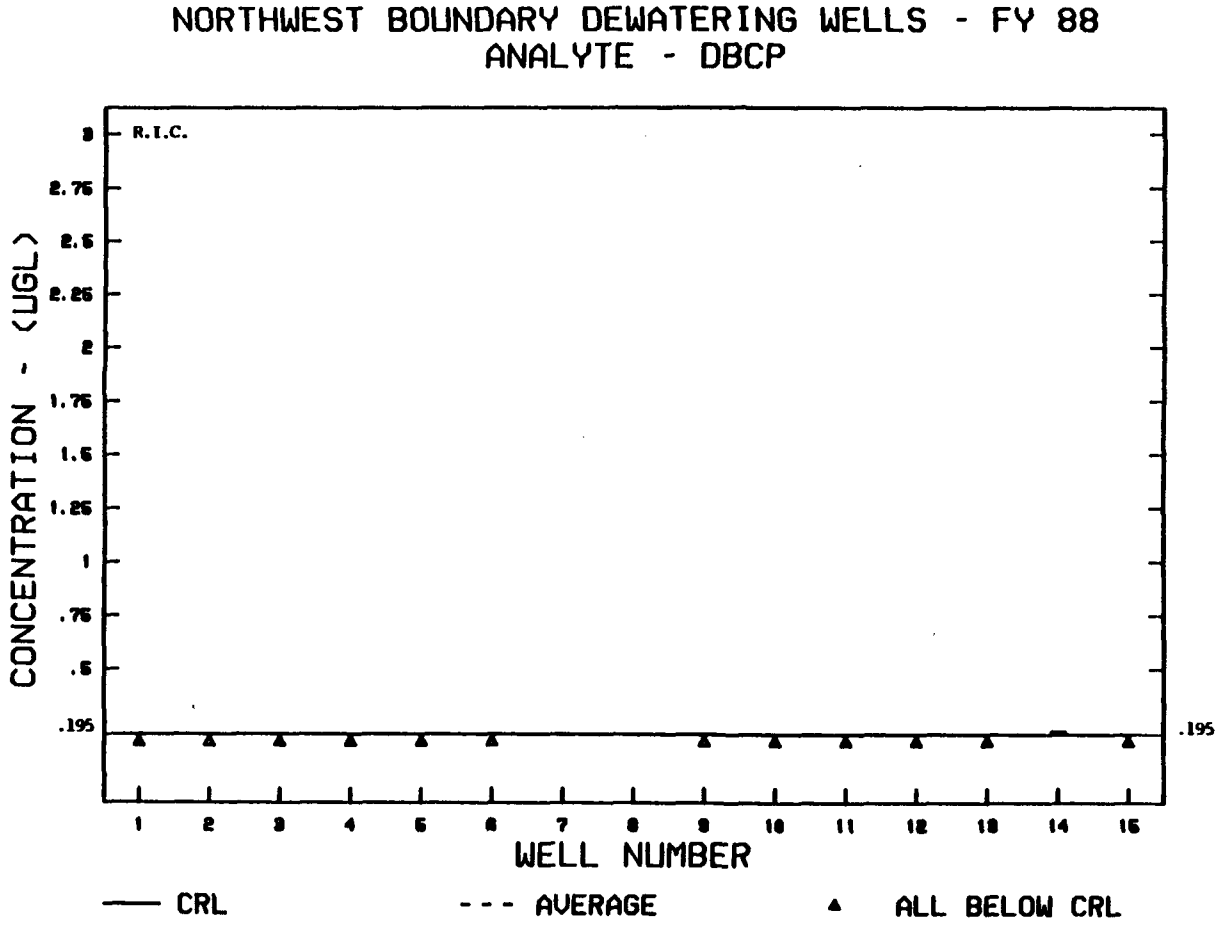


Figure 18. Dibromochloropropane (DBCP) concentrations in northwest boundary dewatering wells, FY88.

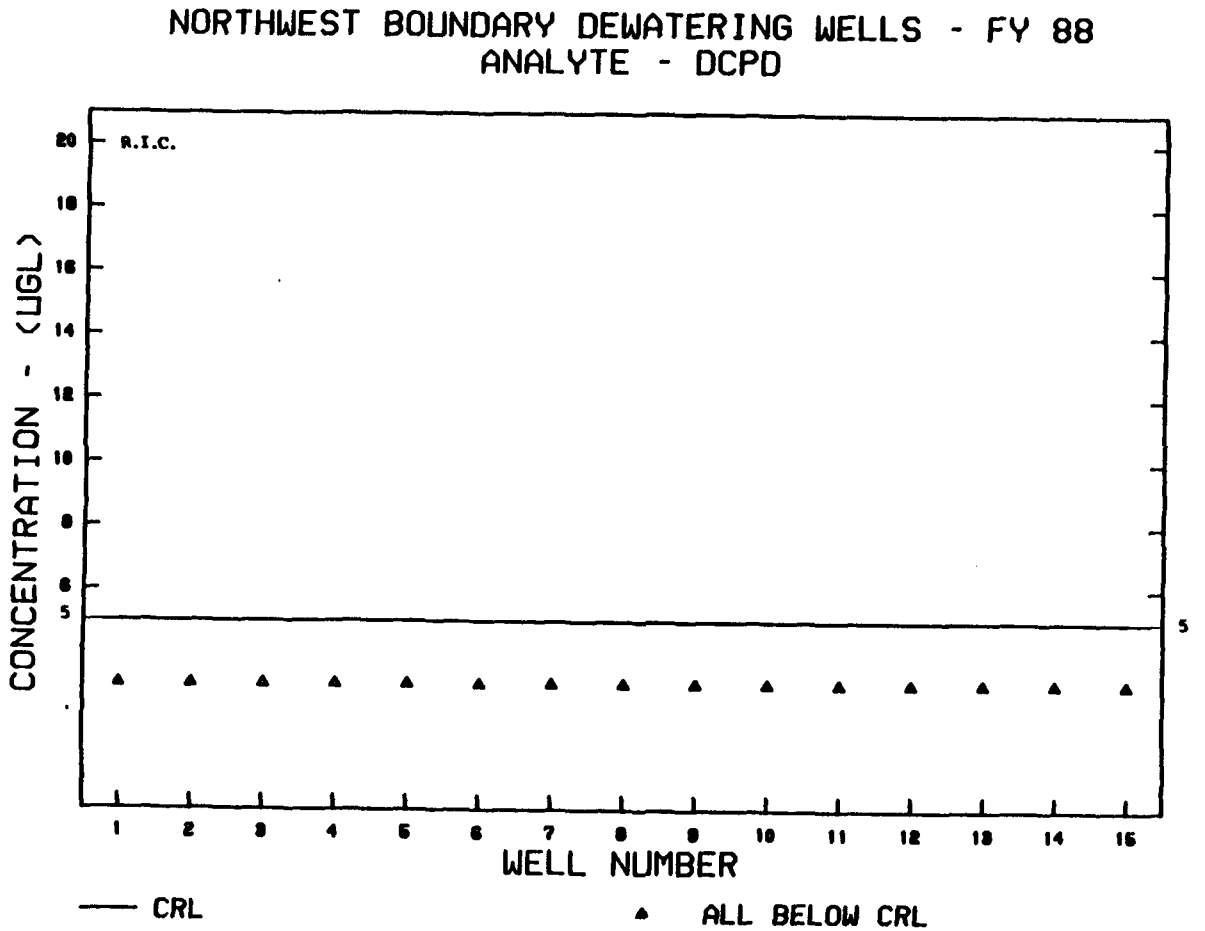


Figure 19. Dicyclopentadiene (DCPD) concentrations in northwest boundary dewatering wells, FY88.

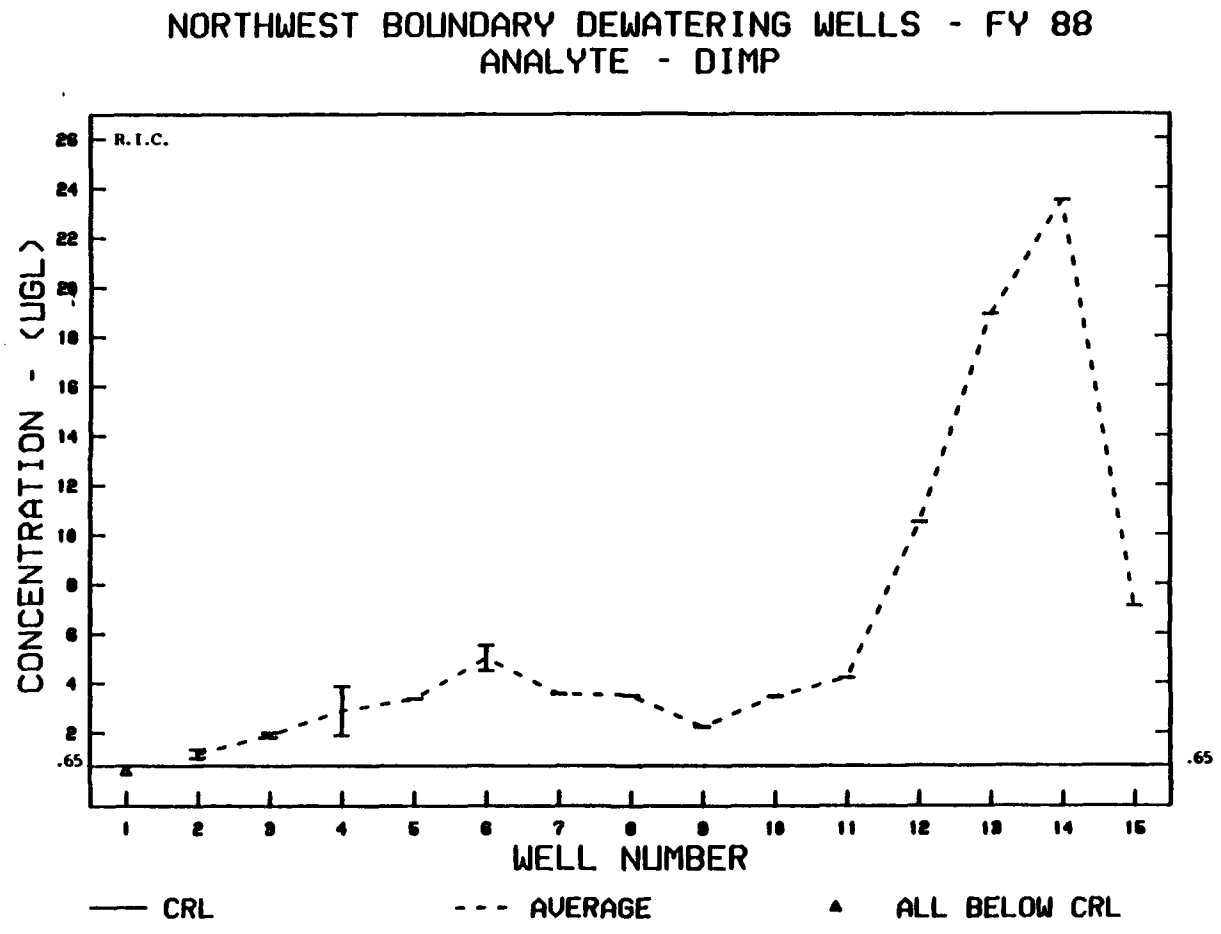


Figure 20. Diisopropylmethylphosphonate (DIMP) concentrations in northwest boundary dewatering wells, FY88.

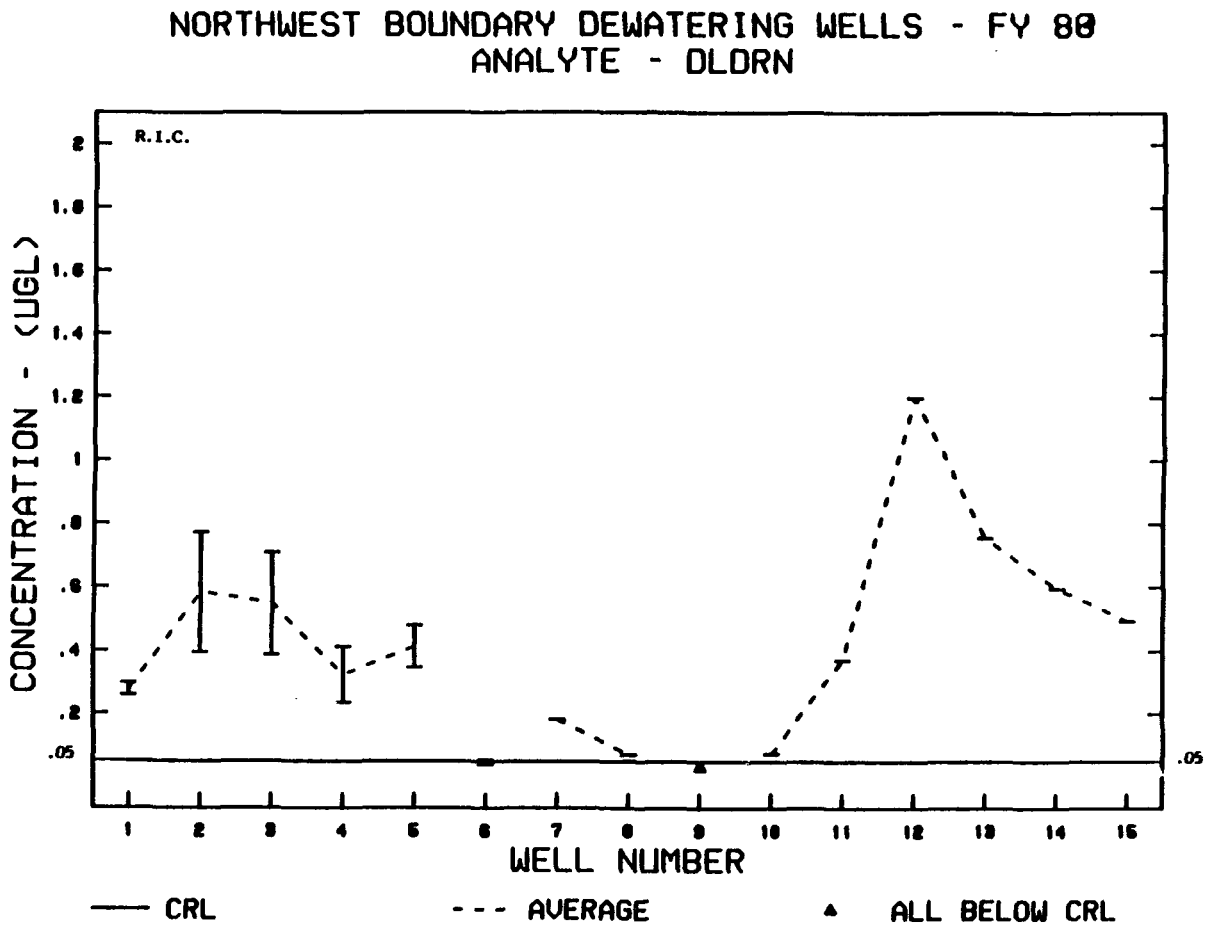


Figure 21. Dieldrin concentrations in northwest boundary dewatering wells, FY88.

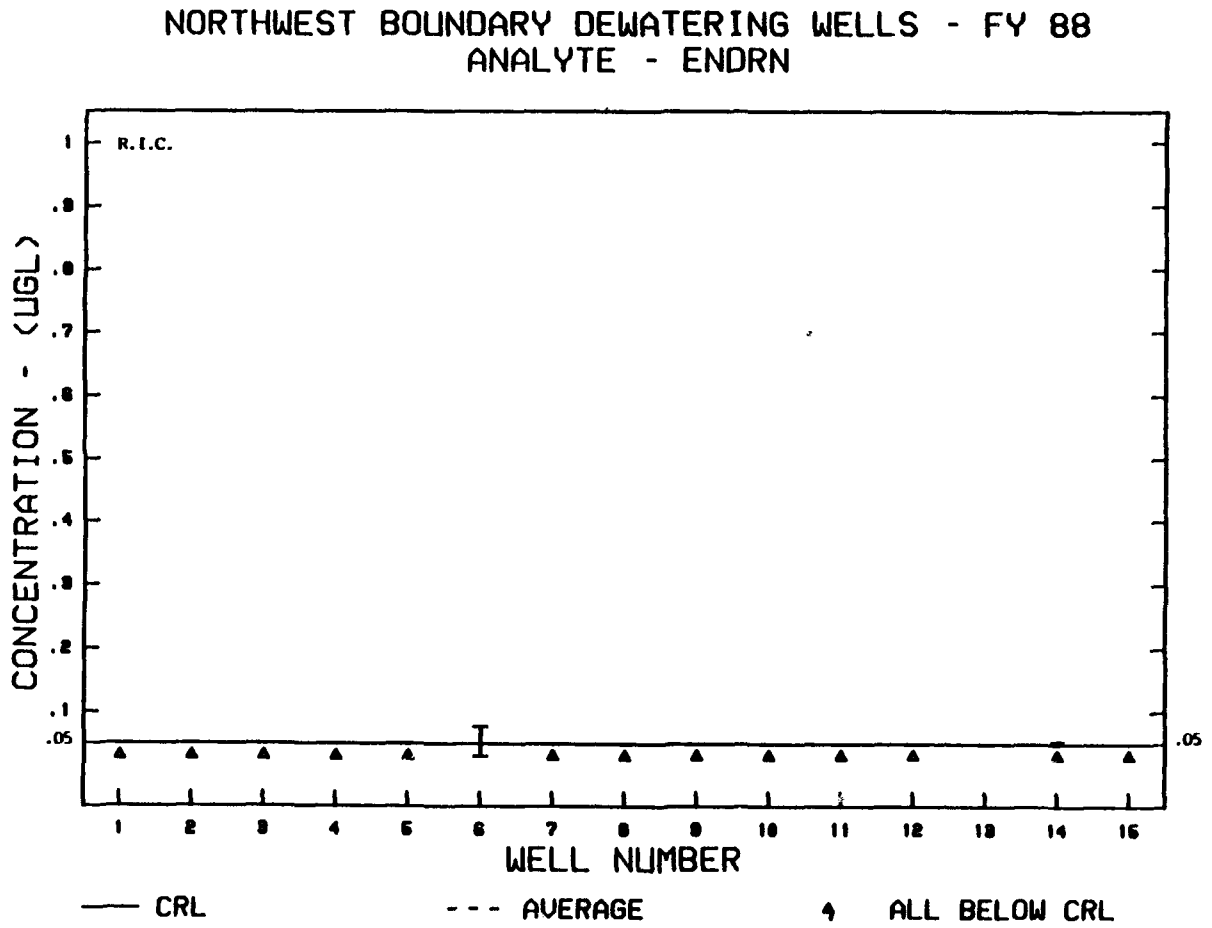


Figure 22. Endrin concentrations in northwest boundary dewatering wells, FY88.

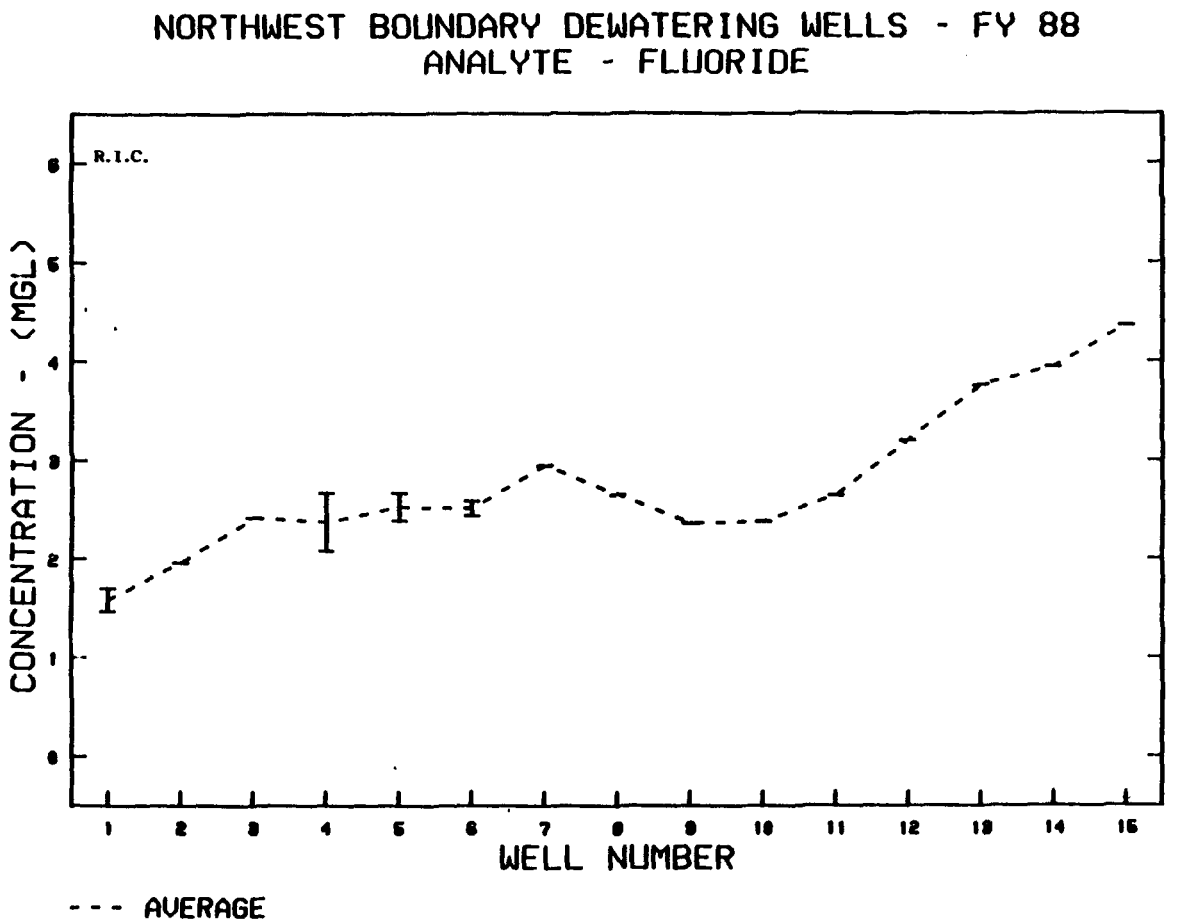


Figure 23. Fluoride concentrations in northwest boundary dewatering wells, FY88.

DBCP

33. During FY88 (Figure 18), only one sample from different dewatering wells was found to contain DBCP above the CRL (0.195 ppb). A value of 0.209 pb was found in Well No. 14 on the northeast end of the system.

DCPD

34. During FY88 (Figure 19), no samples from any of the dewatering wells along the system were found to have concentrations of DCPD above the CRL (5 ppb).

DIMP

35. Concentrations of DIMP (Figure 20) above the CRL (0.65 ppb) were found in samples from all dewatering wells, except No. 1, in FY88. The maximum concentration found was 23.5 ppb associated with Well No. 14.

Dieldrin

36. During FY88, concentrations of dieldrin (Figure 21) above the CRL (0.05) were found in samples from every dewatering well except No. 9 in the system. The highest concentrations were found on the northeast end of the system with the highest concentration of 1.2 ppb found associated with Well No. 12. Concentrations on the southwest end of the system ranged from less than the CRL to a concentration of 0.77 ppb.

Endrin

37. In FY88, only two samples, one each from Wells No. 6 and 14, were found to contain concentrations of endrin (Figure 22) above the CRL (0.05 ppb). The maximum concentration found was 0.077 ppb in Well No. 6.

Fluoride

38. In FY88, fluoride (Figure 23) concentrations increased along the control system from southwest to northeast. The maximum concentration found was approximately 4.4 ppm and was associated with Well No. 15.

Summary of dewatering well data

39. Based on the contaminant concentration data collected for the dewatering wells during FY88, it appears that the highest concentration of contaminants are generally found on the northeast end of the system. These findings are consistent with

the dewatering well data evaluations reported previously by the PMRMA (1988) for the operating periods FY86 and FY87. In general, the contaminant distributions have not changed significantly between FY87 and FY88.

PART IV: GROUND-WATER FLOW EVALUATION

40. Much of this part is a summarization of previous descriptions and documentation in Omaha District (1986), PMSO (1987), PMRMA (1988), and Stollar and Associates (1989). New FY88 data and interpretations made in preparing this report are noted apart.

Geology and Hydrogeology

Geologic Setting

41. The Northwest Boundary Containment system (NWBS) study area is in the northwest corner of RMA in Sections 21, 22, 23, 26, 27, and 28. The geologic units of interest to the NWBS evaluation are the Tertiary-aged Denver formation and the overlying Quaternary sediments. The Denver formation consists of interbedded clay shale, claystone, siltstone, sandstone and occasional lignite. The top of the Denver formation in the NWBS study area ranges from 10 to 70 ft below the ground surface. The Quaternary age surficial deposits (the "alluvium" of this report) overlying the Denver formation consist of windblown and stream-deposited materials of clay to gravel size. The alluvium masks the Denver formation over most of the Arsenal and there are no outcrops in the NWBS study area.

Hydrogeology of Alluvial Aquifer

42. The surficial deposits (the alluvium) of the NWBS area consist of a coarse unit of mostly sand and gravel overlain by a generally fine-grained unit of fine sand, silt, and clay. The alluvium is approximately 10 to 70 ft thick in the area. The greatest thickness of alluvium penetrated was 69.7 ft in Well 27002, in which approximately 37 ft of silty clay and fine sand overlie 33 ft of gravelly sand. The gravelly sand of Well 27002 is typical of the sediments comprising the alluvial aquifer of the NWBS study area.

43. The alluvium is the primary conduit for ground-water movement near the NWBS. The general flow direction for ground water is to the west northwest (Figures

24 through 26). A large component of flow approaches the boundary in a northerly direction within an alluvium-filled paleochannel on the Denver formation surface. The thickness of saturated alluvium varies considerably within the NWBS study area. Saturated alluvium thickness varies from 5 ft in the eastern half of Sections 22 and 27 to 30 ft in the deep paleochannel. The slurry wall portion of the containment system was placed in 5 to 10 ft of saturated alluvium and the extraction well portion in 10 to 25 ft of saturated alluvium.

44. Permeability for the alluvial aquifer at the NWBS was determined by pumping tests to be 0.3 cm/sec. This very permeable material contained cobbles and boulders up to 16 in. across. Aquifer response in these and previous pumping tests ranged from confined to unconfined. Ground-water flow gradients in the alluvial aquifer of the NWBS study area range from about 0.04 in the northeast corner of Section 27 to about 0.0024 in the thick aquifer sands in the western half of Section 27.

Hydrogeology of Denver Formation

45. The Denver formation generally is a complex system of interbedded sandstone and fine-grained claystone and siltstone beds. At the NWBS, the Denver formation consists of interbedded carbonaceous clay shale, claystone, and siltstone and lenticular sandstone units. The sandstone units, generally uncemented, may be locally cemented with calcium carbonate or silica, and are considered the principal aquifers in the Denver formation.

46. The contact between the alluvium and the Denver formation is often marked by a weathered zone within the Denver formation. Lignite beds and carbonaceous shale are common in the formation, as are volcanic fragments and tuffaceous materials. Sandstone beds are mainly discontinuous and lenticular bodies which may be sinuous. The sandstone lenses are distributed in thick claystone sequences and are poorly defined; the sandstone often grades into finer grained types. Figure 27 is a general stratigraphic column for the Denver formation at Rocky Mountain Arsenal divided according to hydrostratigraphic zones.

47. Ground water flows generally to the west-northwest in the Denver formation at the NWBS. The potential for vertical flow between the alluvium and the

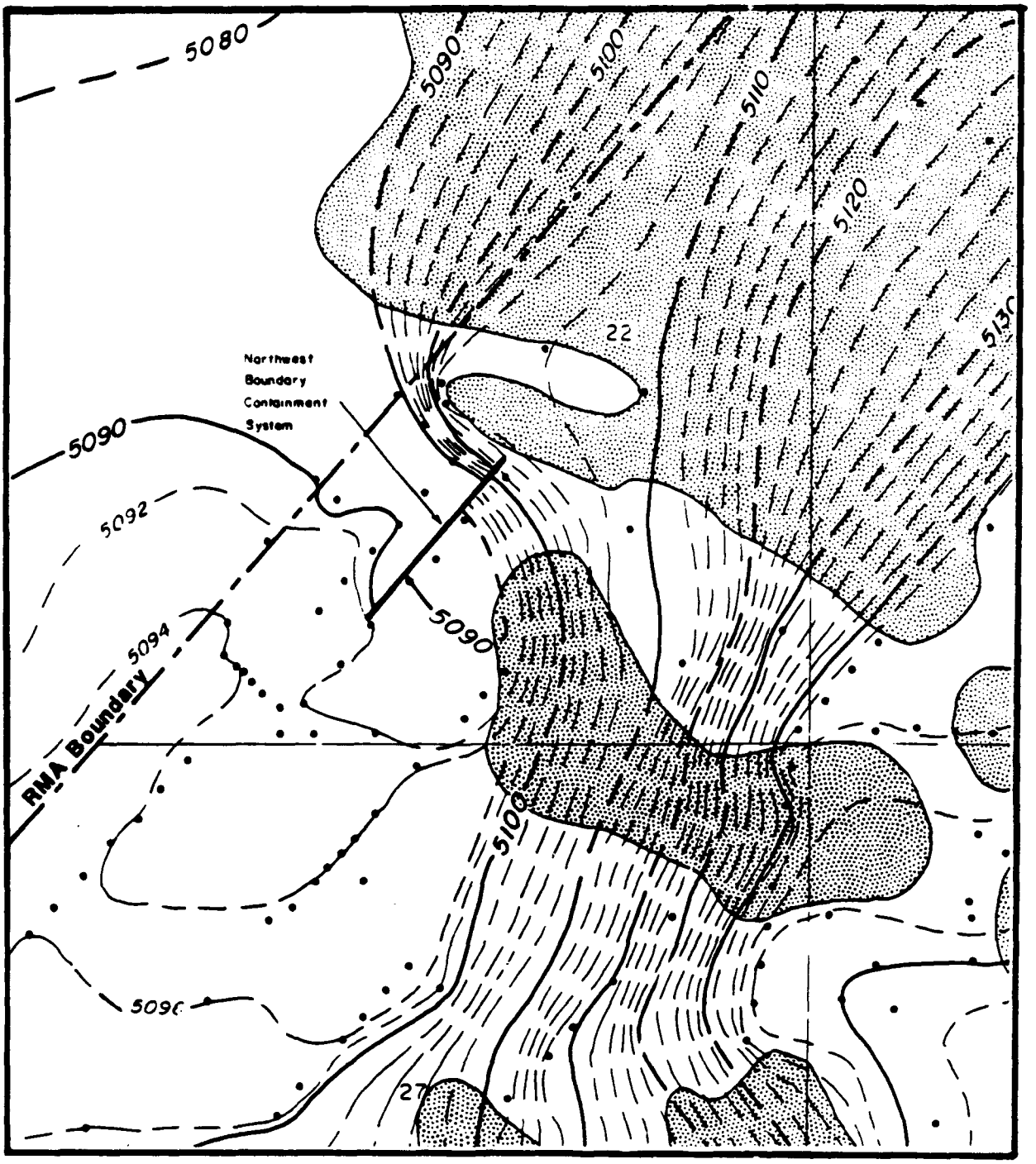
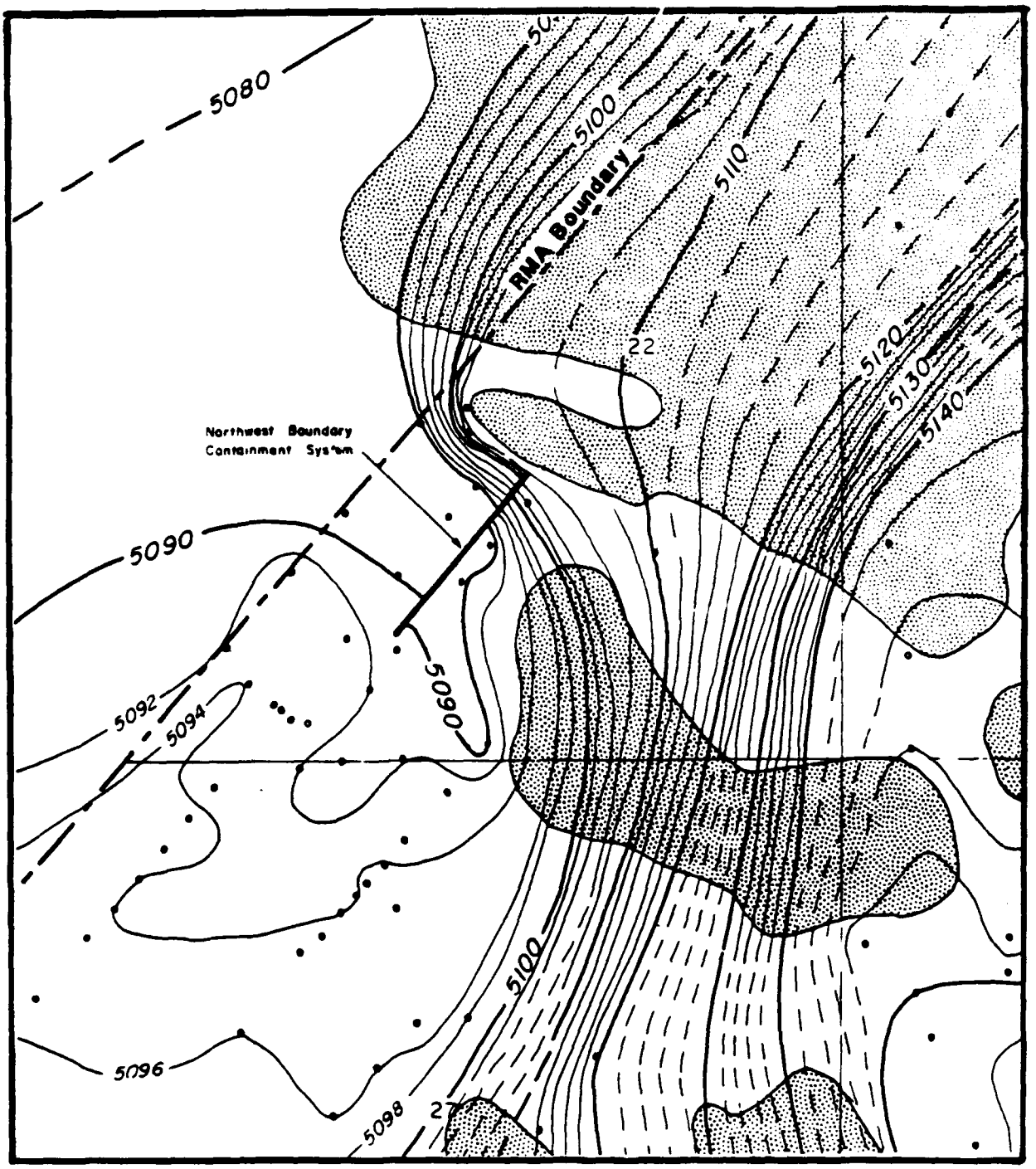


Figure 24. Water Table in Alluvial Aquifer, First Quarter FY88.



EXPLANATION

—5146— Water table contour, (dashed where inferred)

• Well or piezometer

from Stollar & Associates 1989

Approximate of area unsaturated alluvium

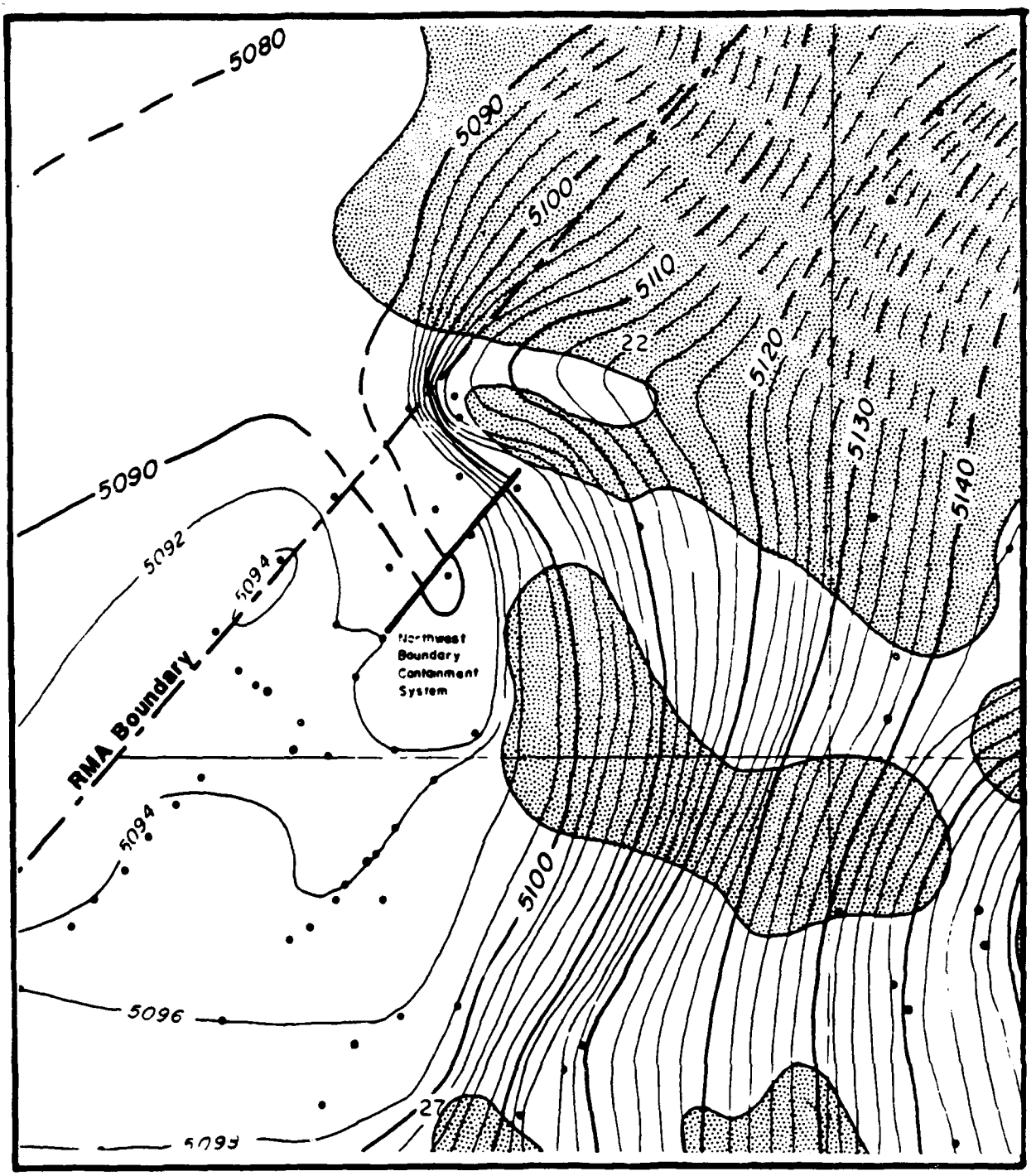
N

0 500 1000 Feet

0 200 400 Meters

Elevation in feet, MSL

Figure 25. Water Table in Alluvial Aquifer, Third Quarter FY88.



EXPLANATION

—5146— Water table contour, (dashed where inferred)

• Well or piezometer

from Stollar & Associates 1989

Approximate of area unsaturated alluvium

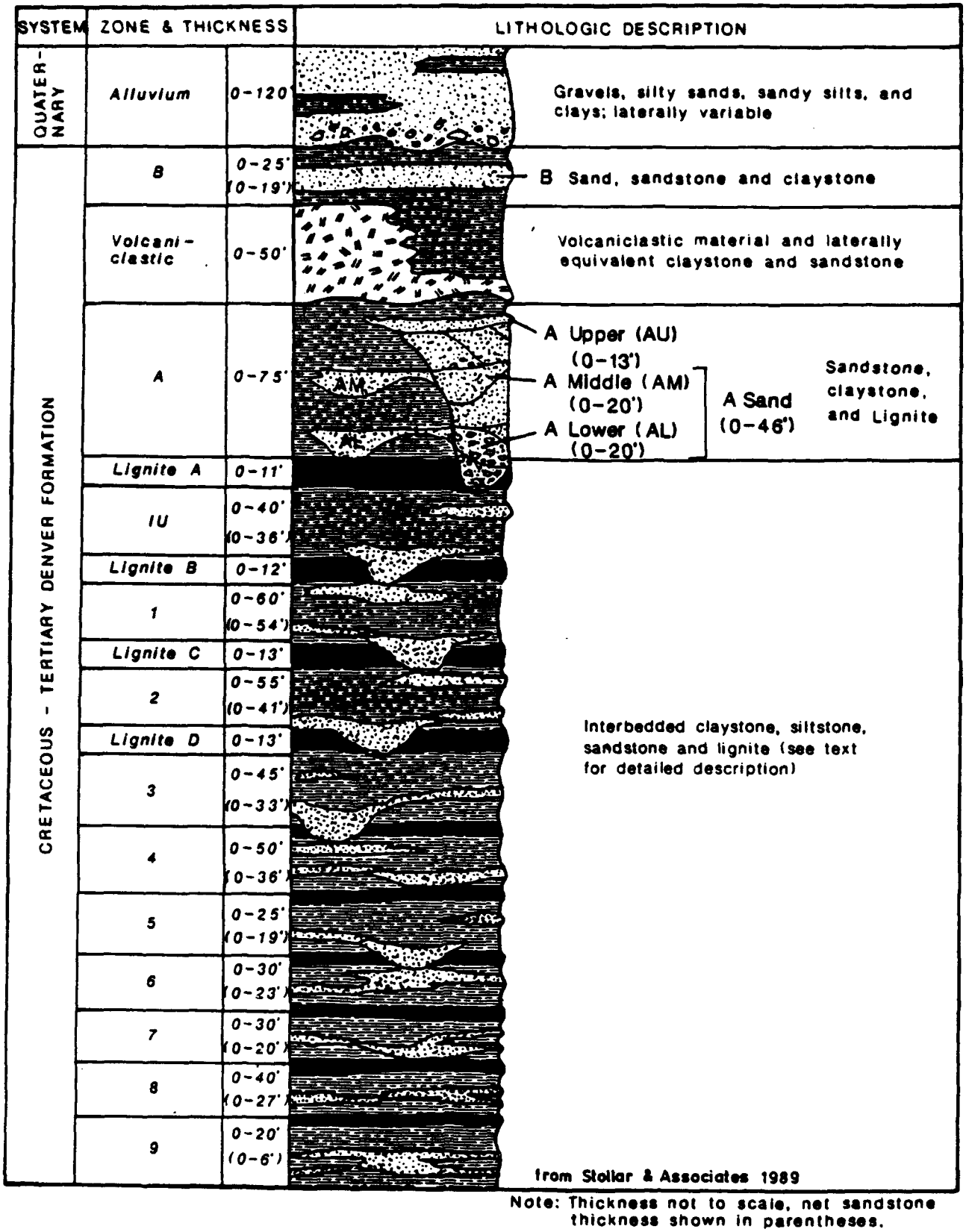
N

0 500 1000 Feet

0 200 400 Meters

Elevation in feet, MSL

Figure 26. Water Table in Alluvial Aquifer, Fourth Quarter FY88.



Note: Thickness not to scale, net sandstone thickness shown in parentheses.

Figure 27. Hydrostratigraphic Zonation in Denver Formation.

Denver formation is generally downward. Hydraulic gradients of horizontal flow range from 0.01 to 0.003 ft/ft. Generally, the Denver formation sandstones have a permeability three orders of magnitude lower than the coarsest alluvium.

Ground-Water Hydrology

Behavior of Alluvial Aquifer

48. Maps of the water table in the alluvium are shown in Figures 24 through 26 for the first, third, and fourth quarters of FY88. No readings were taken in the second quarter. Figures 28 through 31 present profiles used to evaluate changes in water table in FY88 relative to previous years. Most of the water levels shown on the profiles are readings taken in the monitoring wells, but those indicated by dashed symbol are based on contours interpreted for the water-level maps (Figures 24 through 26). Contour maps and profiles for previous years are contained in the documents mentioned above.

49. Water-table readings indicate that ground-water levels in FY88 were again relatively stable. System flow rates were increased substantially in FY88 over the previous years.

FY	Average Flow Rate (gpm)
85	554.2
86	568.6
87	495.3
88	611.8

Rates in FY87 had been low in contrast. The combined average of these high-flow and low-flow years agrees well with the long-term average flow rate.

50. Previous documentation of the NWBS area has considered influences on ground-water flow. Annual precipitation fluctuations appear to have little effect on ground-water levels in the alluvial aquifer. The Stapleton Airport station observed the following totals in recent years.

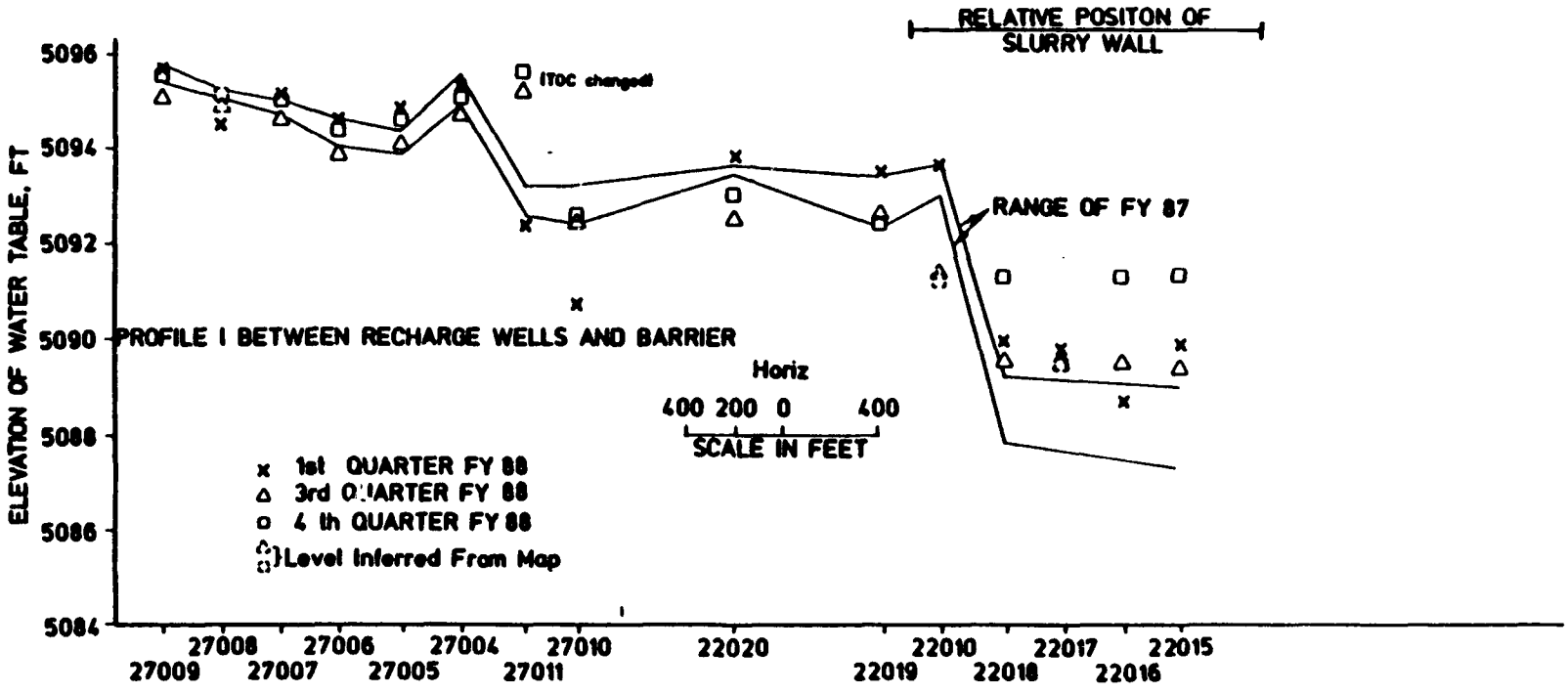


Figure 28. Profile I for FY88.

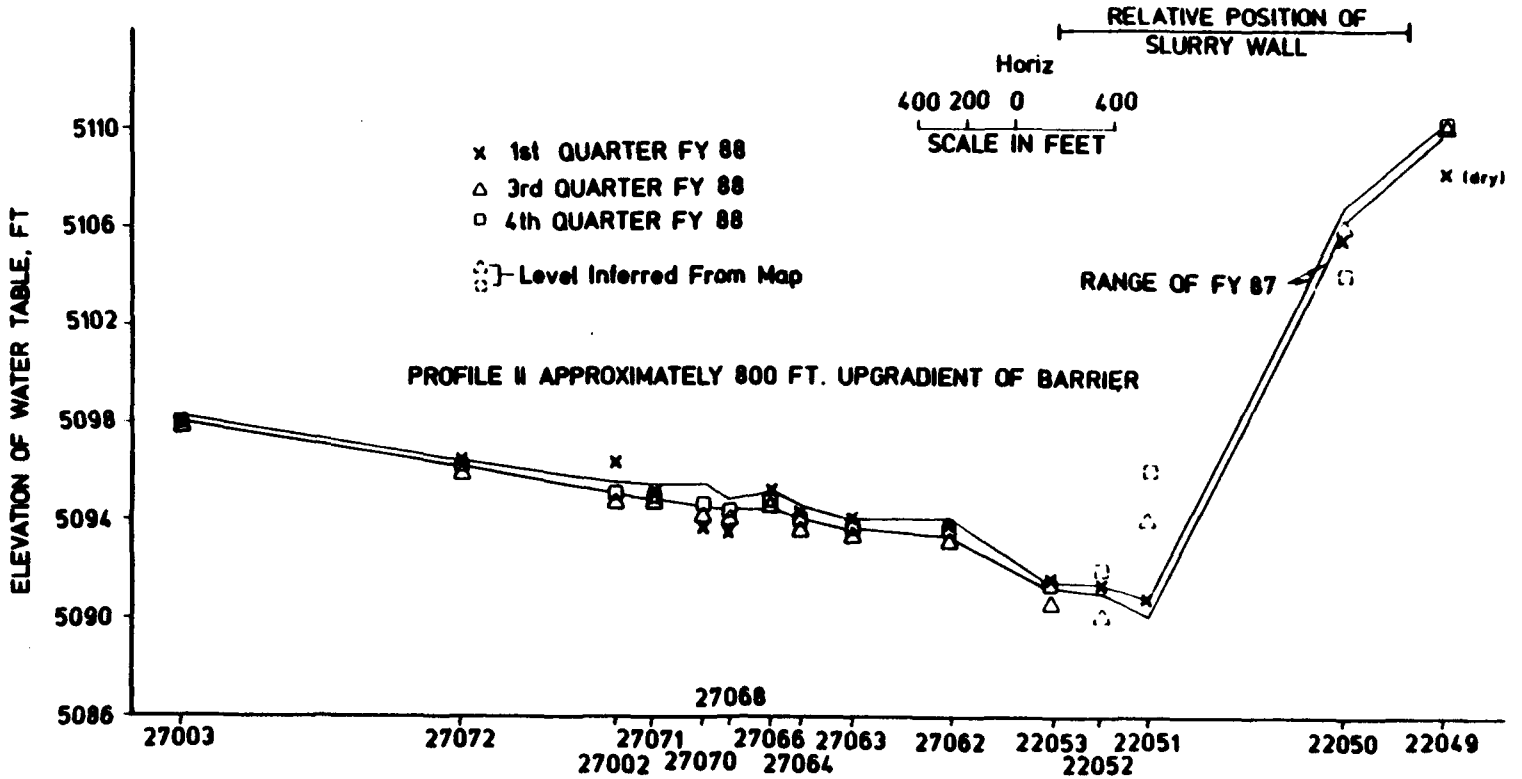


Figure 29. Profile II for FY88.

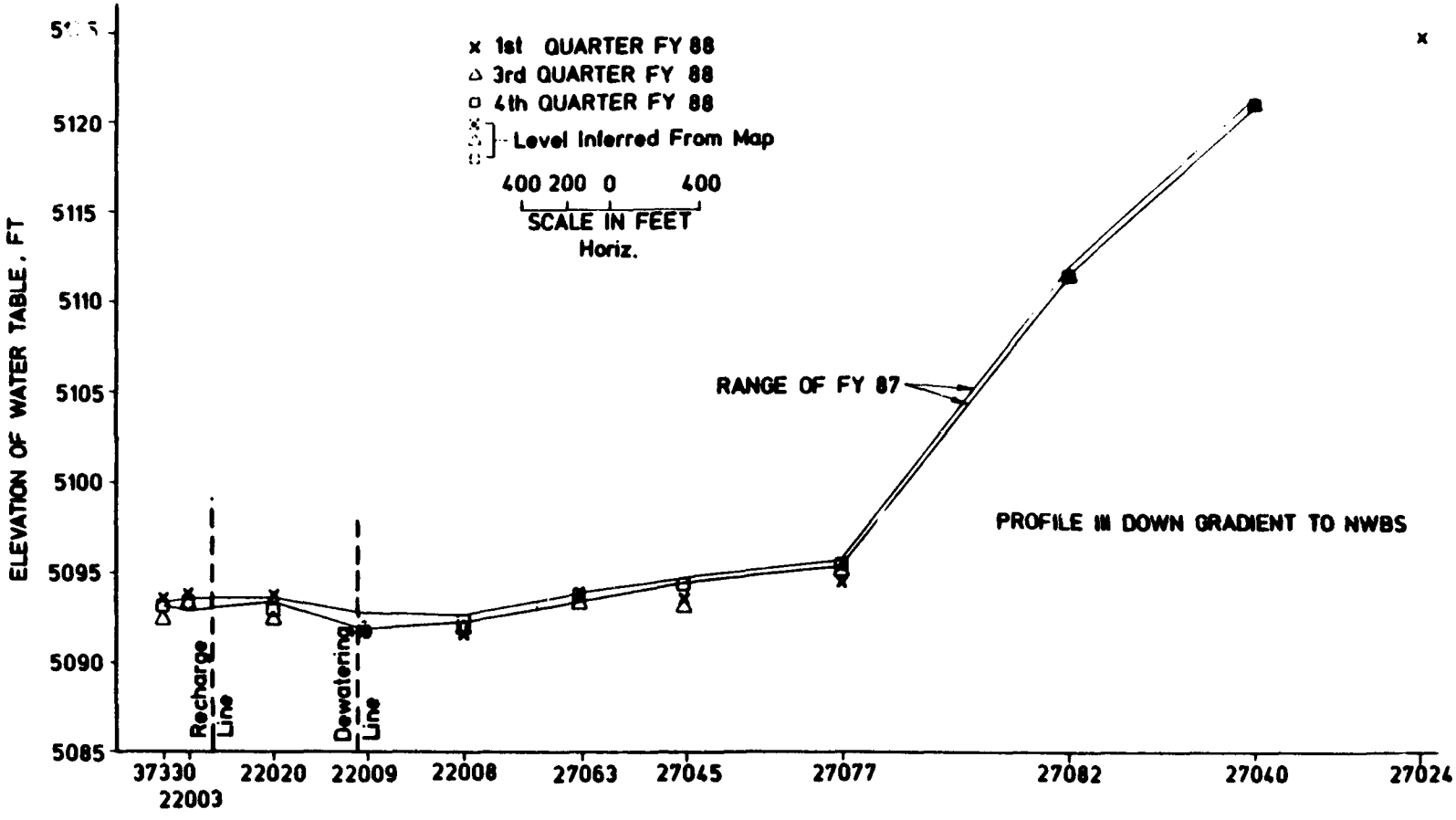


Figure 30. Profile III for FY88.

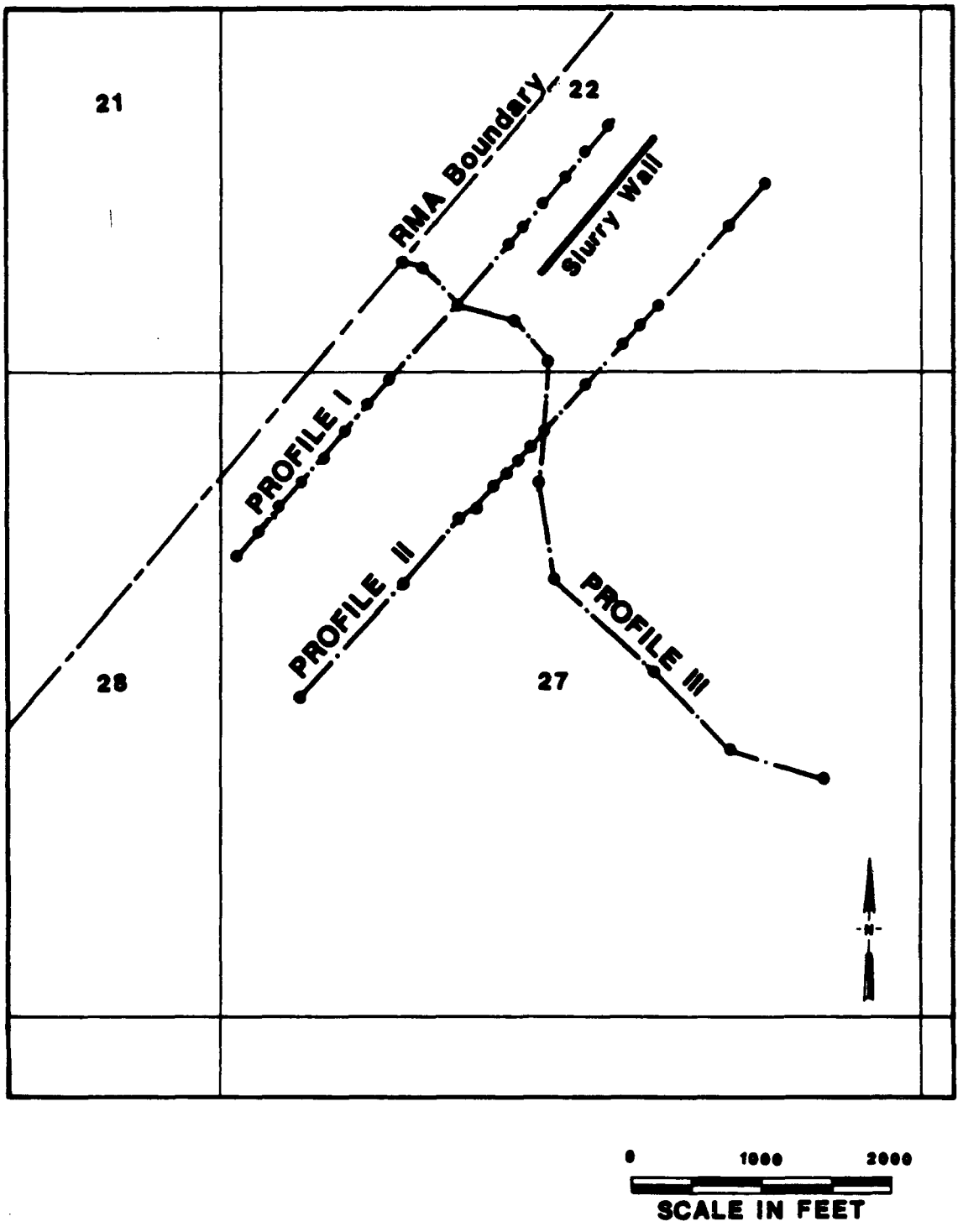


Figure 31. Location of Water-Table Profiles.

FY	Average Precipitation (in.)
85	17.82
86	11.54
87	19.05
88	17.55

Annual precipitation for FY88, FY87, and FY85 are similar at more than 17.5 in. The long-term annual average is 15 in., so that one may generalize that three of the last four years have been above average in precipitation. Flow rates through the NWBS have kept pace with the variations in precipitation.

51. In the fourth quarter of FY88, a management decision was made to increase system flow. The intention was to increase the recharge at the northern end of the system in order to raise ground-water levels downstream of the barrier. The objective was to produce a reverse gradient (southeastward) across the barrier. Additional plant volume was directed to recharge wells in this area. Notice on Figure 28 how the water table was raised in the vicinity of Wells 22018 to 22015.

52. Water levels along Profile I (Figure 28) located between the line of dewatering wells and the line of recharging wells mostly show little if any change from the range of FY87 values. Exceptions departing conspicuously from FY87 values are Wells 22010, 22018, 22017, 22016, and 22015. These five wells are located between the slurry-wall barrier and the recharging wells in what has been recognized previously as a location of fluctuating flow. The water table fluctuated 3 to 4 ft here in FY87. In FY88 the location exhibited the usual, large seasonal variability but at an average level about 2 ft higher than that in FY87. This higher position correlated with the relatively high flow rate for the system in FY88. The highest of water levels (4th quarter) corresponded to the highest of quarterly flow rates of 654 gpm. See the discussion in paragraph 54.

53. Away from the slurry wall the water levels in FY88 were about the same as those in FY87. High water levels in Well 27011 are probably incorrect and instead probably reflect a change in the top of casing. Water-table readings along Profile II (Figure 29) were in close accord with those of the previous year indicating a

continuation of the stability in water-table configuration described in previous years. Departures from FY87 levels tend to be those less reliable values projected from the maps (Figures 24-26) instead of actual measurements. Profile III (Figure 30) roughly parallels the direction of ground-water flow. The close agreement of values in FY88 with the range of values for FY87 confirms again the continued stability of the ground-water system at the NWBS.

Gradient Across Wells and Barrier

54. The hydrologic effectiveness of the NWBS is reflected by the ground-water gradient across the system. The system needs to maintain a favorable southeastward gradient for most efficient performance, especially along its southern half where no barrier is present. The degree to which the reverse gradient condition was achieved in FY88 is shown in Figure 32. For each of the three quarters of measurement, ground-water levels are compared along lines paralleling the barrier on the northwest and southeast. The line on the northwest side is the same as Profile I (Figure 28); the line on the southeast passes immediately adjacent to the barrier. For all three measured quarters, the water levels on the southeast were at or below the levels on the northwest. This tendency to a favorable gradient became conspicuous across the barrier in the fourth quarter when flow to recharge wells located there was increased substantially. The plant flow rate was increased for that purpose and averaged 654 gpm during the quarter. The favorable head difference across the barrier then exceeded 2 ft.

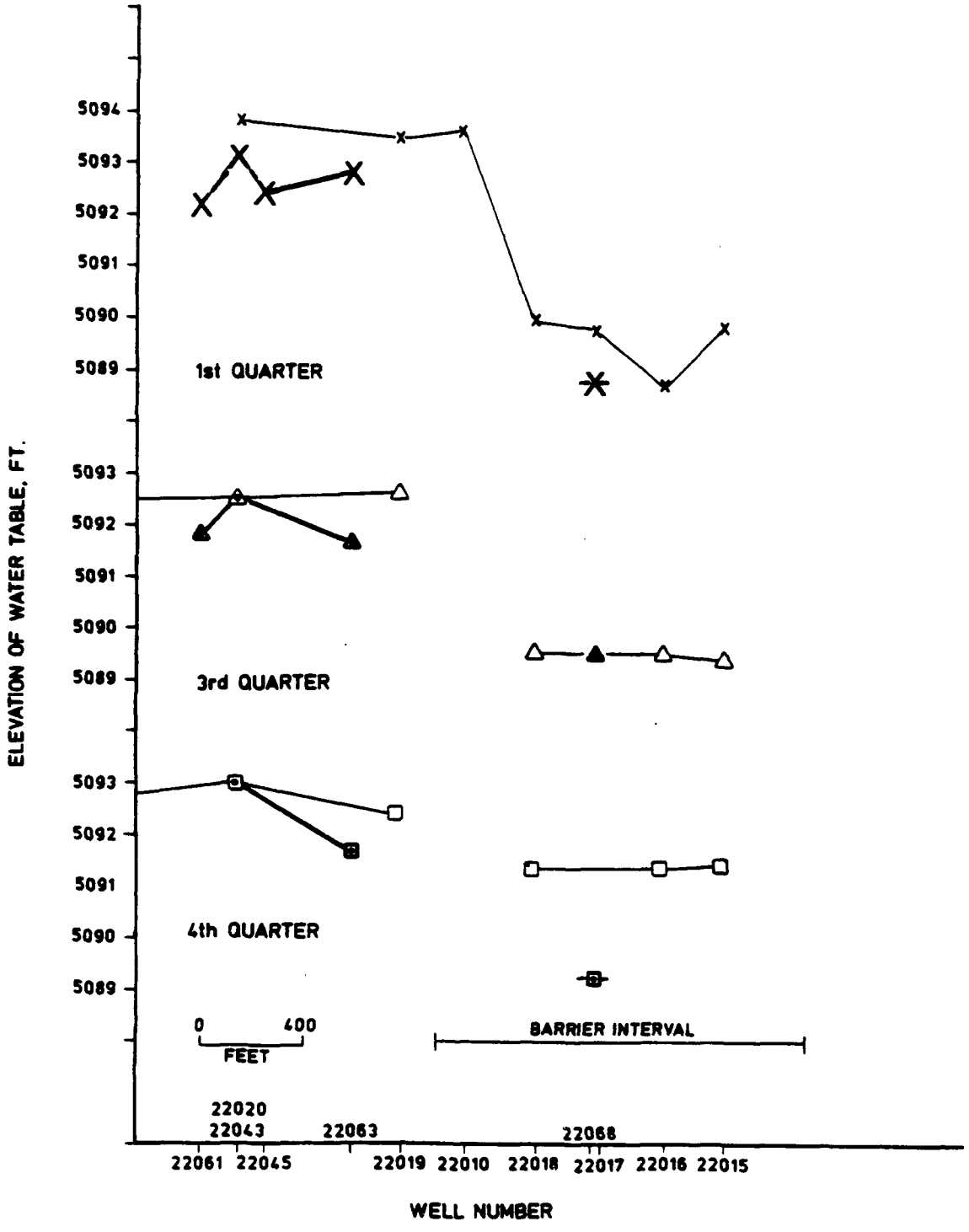


Figure 32. Comparison of Ground-Water Levels on Northwest Side (light symbols) and Southeast Side (heavy symbols) of Barrier.

PART V: CONCLUSIONS

55. Based on the evaluation of the FY88 operations data for the Northwest Boundary System, the following conclusions can be made.

a. Ground-water levels in the NWBS areas were stable for FY88 and closely followed those of FY86 and FY87. The ground-water contours indicate that, at the current operating rates, the NWBS is effectively intercepting ground-water flow moving toward the system in the alluvium. The consistent and effective reverse gradient along the hydrological control portion of the system continued in FY88.

b. The flow rate through the system has been approximately 550 gpm over the last few years. Average flow rate increased to 654 gpm in the fourth quarter FY88 when a management decision was made to increase recharge rate opposite the barrier.

c. A need remains for additional monitoring of existing wells and installation of new monitoring wells for a comprehensive assessment of the operational effectiveness of the NWBS.

d. The treatment system is, in general, effectively removing organic contaminants from the influent to the system. Inorganic contaminants, such as chloride and fluoride, are not removed by the treatment system.

e. Based on the data collected for the dewatering wells, the highest concentrations of contaminants are generally found on the northeast end of the control system. This finding is consistent with those reported previously (PMRMA 1988) for the NWBS. Between FY87 and FY88, the concentrations of the contaminants did not vary significantly.

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Program Manager for Rocky Mountain Arsenal (PMRMA). 1988. "Northwest Boundary Containment/Treatment System Operational Assessment Report, FY87, Final Report," Rocky Mountain Arsenal Information Center Reference Library Number 89263R02, Rocky Mountain Arsenal, Commerce City, Colorado.

Stollar and Associates. 1989. "Comprehensive Monitoring Program: Annual Ground Water Report for 1988 Final Report," Rocky Mountain Arsenal Information Center Library No. 89213R01, Rocky Mountain Arsenal, Commerce City, Colorado.

APPENDIX A
FLOW DATA

R.I.C.

NORTHWEST BOUNDARY TREATMENT PLANT
FY 88 WEEKLY FLOWS FOR ADSORBERS

DATE	1 GAL(000)	1 GPM	2 GAL(000)	2 GPM	3 GAL(000)	3 GPM	TOTAL GAL(000)	TOTAL GPM
10/07/87	500	49.53	2538	251.41	2510	248.64	5548	549.58
10/14/87	2891	286.24	0	0.00	2600	257.43	5491	543.67
10/21/87	2898	288.21	0	0.00	2411	239.78	5309	527.99
10/28/87	2883	284.74	0	0.00	3118	307.95	6001	592.69
11/04/87	2656	263.36	0	0.00	2871	284.68	5527	548.04
11/11/87	2975	292.67	952	93.65	2268	223.12	6195	609.44
11/18/87	2835	282.45	3317	330.48	0	0.00	6152	612.93
11/25/87	2855	285.41	3336	333.50	0	0.00	6191	618.91
12/02/87	2177	215.22	2630	260.01	0	0.00	4807	475.23
12/09/87	2917	288.95	3324	329.27	0	0.00	6241	618.22
12/16/87	2889	285.47	3260	322.13	0	0.00	6149	607.60
12/23/87	2879	283.09	3205	315.14	0	0.00	6084	598.23
12/30/87	2837	282.29	3178	316.22	0	0.00	6015	598.51
01/06/88	2872	285.77	3186	317.01	0	0.00	6058	602.78
01/13/88	2842	280.28	3161	311.74	0	0.00	6003	592.02
01/20/88	2823	281.74	3082	307.58	0	0.00	5905	589.32
01/27/88	2591	258.07	2776	276.49	0	0.00	5367	534.56
02/03/88	2967	293.76	3132	310.10	0	0.00	6099	603.86
02/10/88	2965	293.86	3132	310.41	0	0.00	6097	604.27
02/17/88	2990	295.45	3160	312.25	0	0.00	6150	607.70
02/24/88	2148	214.26	3006	299.85	723	72.12	5877	586.23
03/02/88	0	0.00	3020	299.75	2846	282.48	5866	582.23
03/09/88	0	0.00	2998	297.27	3209	318.20	6207	615.47
03/16/88	0	0.00	3008	298.56	3117	309.38	6125	607.94
03/23/88	0	0.00	3006	296.74	3058	301.88	6064	598.62
03/30/88	0	0.00	2929	290.66	2927	290.46	5856	581.12
04/06/88	0	0.00	2862	286.97	2868	287.58	5730	574.55
04/13/88	350	34.72	3171	314.58	2157	213.99	5678	563.29
04/20/88	2929	288.57	3600	354.68	0	0.00	6529	643.25
04/27/88	3178	317.32	3396	339.09	0	0.00	6574	656.41
05/04/88	3019	299.65	2975	295.29	0	0.00	5994	594.94
05/11/88	2815	279.27	3019	299.50	0	0.00	5834	578.77
05/18/88	2768	274.60	2770	274.80	339	33.63	5877	583.03
05/25/88	3275	324.74	0	0.00	3073	304.71	6348	629.45
06/01/88	3341	331.78	0	0.00	3171	314.90	6512	646.68
06/08/88	3489	345.96	0	0.00	3164	313.73	6653	659.69
06/15/88	3798	376.23	0	0.00	2912	288.46	6710	664.69
06/22/88	3900	387.48	0	0.00	2708	269.05	6608	656.53
06/29/88	3847	381.46	0	0.00	2744	272.09	6591	653.55
07/06/88	3839	380.66	0	0.00	2851	282.70	6690	663.36
07/13/88	3811	378.26	0	0.00	2726	270.57	6537	648.83
07/20/88	3794	376.58	0	0.00	2879	285.76	6673	662.34
07/27/88	3789	374.59	0	0.00	2927	289.37	6716	663.96

R.I.C.

NORTHWEST BOUNDARY TREATMENT PLANT
FY 88 WEEKLY FLOWS FOR ADSORBERS

DATE	1		2		3		TOTAL	
	GAL(000)	GPM	GAL(000)	GPM	GAL(000)	GPM	GAL(000)	GPM
08/03/88	3741	372.24	0	0.00	2942	292.74	6683	664.98
08/10/88	2744	272.36	0	0.00	2043	202.78	4787	475.14
08/17/88	0	0.00	3851	381.48	3055	302.63	6906	684.11
08/24/88	0	0.00	3545	352.04	2950	292.95	6495	644.99
08/31/88	0	0.00	3486	345.83	2962	293.85	6448	639.68
09/07/88	0	0.00	3697	365.86	3227	319.35	6924	685.21
09/14/88	0	0.00	3732	370.42	3192	316.82	6924	687.24
09/21/88	0	0.00	3855	383.39	3076	305.92	6931	689.31
09/30/88	0	0.00	5078	391.67	3917	302.12	8995	693.79

R.I.C.

NORTHWEST BOUNDARY TREATMENT PLANT
FY 88 QUARTERLY FLOWS FOR ADSORBERS

DATE	1		2		3		TOTAL	
	GAL(000)	GPM	GAL(000)	GPM	GAL(000)	GPM	GAL(000)	GPM
1st QTR	34192	260.59	25740	196.29	15778	120.12	75710	577.00
2nd QTR	22198	169.48	39596	302.19	15880	121.12	77674	592.78
3rd QTR	36709	280.14	21793	166.53	23136	176.78	81638	623.45
4th QTR	21718	165.75	27244	199.28	38747	289.04	87709	654.07
ANNUAL	114817	218.99	114373	216.07	93541	176.77	322731	611.83

APPENDIX B
TREATMENT PLANT WATER QUALITY DATA STATISTICAL SUMMARY AND GC/MS ANALYSIS

NORTHWEST BOUNDARY TREATMENT PLANT - INFLUENT FOR FY 88

SAMPLE DATE	ORG	111TCE ug/l	112TCE ug/l	11DCE ug/l	11DCLE ug/l	12DCE ug/l	12DCLE ug/l	ALDRN ug/l	AS ug/l	BTZ ug/l
10/07/87	ES	....	....	....	....	....	....	LT 0.083	....	....
10/14/87	ES	....	....	....	....	....	....	LT 0.083	....	....
10/21/87	ES	....	....	....	....	....	....	LT 0.083	....	....
10/28/87	ES	....	....	....	....	....	....	LT 0.083	....	....
11/04/87	ES	LT 1.09	LT 1.63	LT 1.85	LT 1.93	....	LT 2.07	LT 0.083	LT 2.52	LT 1.10
11/12/87	ES	....	....	....	....	....	....	LT 0.083	....	....
11/18/87	ES	....	....	....	....	....	....	LT 0.083	....	....
11/25/87	ES	....	....	....	....	....	....	....	....	....
12/02/87	ES	....	....	....	....	....	....	LT 0.083	....	....
12/09/87	ES	LT 1.09	LT 1.63	LT 1.85	LT 1.93	....	LT 2.07	LT 0.083	LT 2.52	LT 1.10
12/16/87	ES	....	....	....	....	....	....	LT 0.083	....	....
12/23/87	ES	....	....	....	....	....	....	....	....	....
12/30/87	ES	....	....	....	....	....	....	....	....	....
01/06/88	ES	....	....	....	....	....	....	LT 0.083	....	....
01/13/88	ES	....	....	....	....	....	....	LT 0.083	....	....
01/20/88	ES	LT 1.09	LT 1.63	LT 1.85	LT 1.93	....	LT 2.07	LT 0.083	LT 2.52	LT 1.10
01/28/88	ES	....	....	....	....	....	....	LT 0.083	....	....
02/03/88	ES	....	....	....	....	....	....	LT 0.083	....	....
02/10/88	ES	....	....	....	....	....	....	LT 0.083	....	....
02/17/88	ES	LT 1.09	LT 1.63	LT 1.85	LT 1.93	....	LT 2.07	LT 0.083	LT 2.52	LT 1.10
02/24/88	RM	....	....	....	....	LT 1.00	LT 1.00	LT 0.2	....	....
03/02/88	RM	....	....	....	....	7.00	LT 1.00	LT 0.2	....	....
03/09/88	RM	....	....	....	....	LT 1.00	LT 1.00	LT 0.2	....	....
03/14/88	RM	....	....	....	....	LT 1.00	LT 1.00	LT 0.2	....	....
03/21/88	RM	....	....	....	....	LT 1.00	LT 1.00	LT 0.2	....	....
03/30/88	RM	....	....	....	....	LT 1.00	LT 1.00	LT 0.2	....	....
04/05/88	RM	....	....	....	....	LT 1.00	LT 1.00	LT 0.2	....	....
04/13/88	UB	....	....	....	....	....	....	LT 0.05	....	....
04/22/88	UB	....	....	....	....	....	....	LT 0.05	....	....
04/27/88	UB	....	....	....	....	....	....	0.12	....	....
05/04/88	UB	....	....	....	....	....	....	LT 0.05	....	....
05/11/88	UB	....	....	....	....	....	....	LT 0.05	....	....
05/18/88	UB	....	....	....	....	....	....	LT 0.05	....	....
05/25/88	UB	....	....	....	....	....	....	LT 0.05	....	....
06/01/88	UB	....	....	....	....	....	....	LT 0.05	....	....
06/08/88	UB	....	....	....	....	....	....	LT 0.05	....	....
06/15/88	UB	....	....	....	....	....	....	LT 0.05	....	....
06/22/88	UB	....	....	....	....	....	....	LT 0.05	....	....
06/29/88	UB	....	....	....	....	....	....	LT 0.05	....	....
07/06/88	UB	....	....	....	....	....	....	....	....	....
07/13/88	UB	....	....	....	....	....	....	LT 0.05	....	....
07/20/88	UB	....	....	....	....	....	....	LT 0.05	....	....
07/27/88	UB	....	....	....	....	....	....	LT 0.05	....	....
08/03/88	UB	....	....	....	....	....	....	LT 0.05	....	....
08/10/88	UB	....	....	....	....	....	....	....	....	....
08/17/88	UB	....	....	....	....	....	....	LT 0.05	....	....
08/24/88	UB	....	....	....	....	....	....	....	....	....
08/31/88	UB	....	....	....	....	....	....	LT 0.05	....	....
09/07/88	UB	....	....	....	....	....	....	LT 0.05	....	....
09/14/88	UB	....	....	....	....	....	....	LT 0.05	....	....
09/21/88	UB	....	....	....	....	....	....	LT 0.05	....	....
09/28/88	UB	....	....	....	....	....	....	LT 0.05	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED

ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTHWEST BOUNDARY TREATMENT PLANT - INFLUENT FOR FY 88

SAMPLE DATE	ORG	C6H6 ug/l	CCL4 ug/l	CH2CL2 ug/l	CHCL3 ug/l	CHLORIDE mg/l	CLC6H5 ug/l	CLDAN ug/l	CPMS ug/l	CPMSO ug/l
10/07/87	ES	....	....	....	....	313	....	LT 0.152	....	....
10/14/87	ES	....	....	....	....	348	....	LT 0.152	....	....
10/21/87	ES	....	....	....	....	416	....	LT 0.152	....	....
10/28/87	ES	....	....	....	....	154	....	LT 0.152	....	....
11/04/87	ES	LT 1.92	LT 1.69	LT 2.48	25.30	348	LT 1.36	LT 0.152	LT 1.08	LT 1.98
11/12/87	ES	....	....	....	....	321	....	LT 0.152	....	....
11/18/87	ES	....	....	....	....	348	....	LT 0.152	....	....
11/25/87	ES	....	....	....	....	381	....	....	....	....
12/02/87	ES	....	....	....	....	369	....	LT 0.152	....	....
12/09/87	ES	LT 1.92	LT 1.69	LT 2.48	20.50	346	LT 1.36	LT 0.152	LT 1.08	LT 1.98
12/16/87	ES	....	....	....	....	....	....	LT 0.152	....	....
12/23/87	ES	....	....	....	....	....	....	....	....	....
12/30/87	ES	....	....	....	....	....	....	....	....	....
01/06/88	ES	....	....	....	....	371	....	LT 0.152	....	....
01/13/88	ES	....	....	....	....	324	....	LT 0.152	....	....
01/20/88	ES	LT 1.92	LT 1.69	LT 2.48	22.60	349	LT 1.36	LT 0.152	LT 1.08	LT 1.98
01/28/88	ES	....	....	....	....	334	....	LT 0.152	....	....
02/03/88	ES	....	....	....	....	343	....	LT 0.152	....	....
02/10/88	ES	....	....	....	....	342	....	LT 0.152	....	....
02/17/88	ES	LT 1.92	LT 1.69	LT 2.48	18.90	339	LT 1.36	LT 0.152	LT 1.08	LT 1.98
02/24/88	RM	....	LT 1.00	....	30.00	378	....	....	LT 20.00	LT 20.00
03/02/88	RM	....	LT 1.00	....	40.00	358	....	....	LT 20.00	LT 20.00
03/09/88	RM	....	LT 1.00	....	30.00	400	....	....	LT 20.00	LT 20.00
03/14/88	RM	....	LT 1.00	....	40.00	400	....	....	LT 20.00	LT 20.00
03/21/88	RM	....	LT 1.00	....	30.00	....	....	....	LT 20.00	LT 20.00
03/30/88	RM	....	LT 1.00	....	30.00	400	....	....	LT 20.00	LT 20.00
04/05/88	RM	....	LT 1.00	....	40.00	384	....	....	LT 20.00	LT 20.00
04/13/88	UB	....	....	....	....	390	....	....	LT 5.69	LT 11.50
04/22/88	UB	....	....	....	....	300	....	....	LT 5.69	LT 11.50
04/27/88	UB	....	....	....	....	320	....	....	LT 5.69	LT 11.50
05/04/88	UB	....	....	....	....	....	....	....	LT 5.69	LT 11.50
05/11/88	UB	....	....	....	....	340	....	....	LT 5.69	LT 11.50
05/18/88	UB	....	....	....	....	330	....	....	LT 5.69	LT 11.50
05/25/88	UB	....	....	....	....	290	....	....	LT 5.69	LT 11.50
06/01/88	UB	....	....	....	....	480	....	....	LT 5.69	LT 11.50
06/08/88	UB	....	....	....	....	280	....	....	LT 5.69	LT 11.50
06/15/88	UB	....	....	....	....	260	....	....	LT 5.69	LT 11.50
06/22/88	UB	....	....	....	....	360	....	....	LT 5.69	LT 11.50
06/29/88	UB	....	....	....	....	310	....	....	LT 5.69	LT 11.50
07/06/88	UB	....	....	....	....	....	....	....	....	....
07/13/88	UB	....	....	....	....	....	....	....	LT 5.69	LT 11.50
07/20/88	UB	....	....	....	....	300	....	....	LT 5.69	LT 11.50
07/27/88	UB	....	....	....	....	420	....	....	LT 5.69	LT 11.50
08/03/88	UB	....	....	....	....	320	....	....	LT 5.69	LT 11.50
08/10/88	UB	....	....	....	....	....	....	....	....	....
08/17/88	UB	....	....	....	....	330	....	....	LT 5.69	LT 11.50
08/24/88	UB	....	....	....	....	....	....	....	....	....
08/31/88	UB	....	....	....	....	310	....	....	LT 5.69	LT 11.50
09/07/88	UB	....	....	....	....	320	....	....	LT 5.69	LT 11.50
09/14/88	UB	....	....	....	....	340	....	....	LT 5.69	LT 11.50
09/21/88	UB	....	....	....	....	390	....	....	LT 5.69	LT 11.50
09/28/88	UB	....	....	....	....	390	....	....	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED

ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTHWEST BOUNDARY TREATMENT PLANT - INFLUENT FOR FY 88

SAMPLE DATE	ORG	CPMSO2 ug/l	DBCP ug/l	DCPD ug/l	DIMP ug/l	DITH ug/l	DLDRN ug/l	DMDS ug/l	DMMP ug/l	ENDRN ug/l
10/07/87	ES	....	LT 0.13	LT 9.31	LT 10.10	....	0.348	....	LT 16.30	LT 0.06
10/14/87	ES	....	LT 0.13	LT 9.31	LT 10.10	....	0.318	....	LT 16.30	0.11
10/21/87	ES	....	LT 0.13	LT 9.31	LT 10.10	....	0.328	....	LT 16.30	0.09
10/28/87	ES	....	LT 0.13	LT 9.31	LT 10.10	....	0.335	....	LT 16.30	0.99
11/04/87	ES	LT 2.24	LT 0.13	LT 9.31	LT 10.10	LT 3.34	0.297	LT 1.16	LT 16.30	LT 0.06
11/12/87	ES	....	LT 0.13	LT 9.31	LT 10.10	....	0.399	....	LT 16.30	LT 0.06
11/18/87	ES	....	LT 0.13	LT 9.31	LT 10.10	....	0.222	....	LT 16.30	LT 0.06
11/25/87	ES	....	....	....	....	....	....	....	....	....
12/02/87	ES	....	LT 0.13	LT 9.31	LT 10.10	....	0.376	....	LT 16.30	LT 0.06
12/09/87	ES	LT 2.24	LT 0.13	LT 9.31	LT 10.10	LT 3.34	0.370	LT 1.16	LT 16.30	0.11
12/16/87	ES	....	LT 0.13	LT 9.31	LT 10.10	....	0.410	....	LT 16.30	LT 0.06
12/23/87	ES	....	....	....	....	....	....	....	....	....
12/30/87	ES	....	....	....	....	....	....	....	....	....
01/06/88	ES	....	LT 0.13	LT 9.31	LT 10.10	....	0.365	....	LT 16.30	LT 0.06
01/13/88	ES	....	LT 0.13	LT 9.31	LT 10.10	....	0.329	....	LT 16.30	0.13
01/20/88	ES	LT 2.24	LT 0.13	LT 9.31	LT 10.10	LT 3.34	0.380	LT 1.16	LT 16.30	0.11
01/28/88	ES	....	LT 0.13	LT 9.31	LT 10.10	....	0.303	....	LT 16.30	LT 0.06
02/03/88	ES	....	LT 0.13	LT 9.31	LT 10.10	....	0.389	....	LT 16.30	LT 0.06
02/10/88	ES	....	LT 0.13	LT 9.31	LT 10.10	....	0.310	....	LT 16.30	0.07
02/17/88	ES	LT 2.24	LT 0.13	LT 9.31	11.90	LT 3.34	0.367	LT 1.16	LT 16.30	0.12
02/24/88	RM	LT 20.00	LT 0.20	4.00	LT 10.00	LT 20.00	0.410	....	....	LT 0.20
03/02/88	RM	LT 20.00	LT 0.20	4.00	LT 10.00	LT 20.00	0.480	....	....	LT 0.20
03/09/88	RM	LT 20.00	LT 0.20	4.00	LT 10.00	LT 20.00	0.370	....	....	LT 0.20
03/14/88	RM	LT 20.00	LT 0.20	LT 1.00	LT 10.00	LT 20.00	0.280	....	....	LT 0.20
03/21/88	RM	LT 20.00	LT 0.20	3.00	LT 10.00	LT 20.00	0.480	....	....	LT 0.20
03/30/88	RM	LT 20.00	LT 0.20	LT 1.00	LT 10.00	LT 20.00	0.470	....	....	LT 0.20
04/05/88	RM	LT 20.00	LT 0.20	LT 1.00	LT 10.00	LT 20.00	0.400	....	....	LT 0.20
04/13/88	UB	LT 7.46	LT 0.20	LT 5.00	3.41	LT 1.34	0.484	....	....	0.09
04/22/88	UB	LT 7.46	LT 0.20	LT 5.00	1.35	LT 1.34	0.356	....	....	LT 0.05
04/27/88	UB	LT 7.46	LT 0.20	LT 5.00	1.99	LT 1.34	0.457	....	....	0.04
05/04/88	UB	LT 7.46	LT 0.20	LT 5.00	3.68	LT 1.34	0.413	....	....	LT 0.05
05/11/88	UB	LT 7.46	LT 0.20	LT 5.00	4.82	LT 1.34	LT 0.050	....	....	LT 0.05
05/18/88	UB	LT 7.46	LT 0.20	LT 5.00	3.23	LT 1.34	0.646	....	....	LT 0.05
05/25/88	UB	LT 7.46	LT 0.20	LT 5.00	1.25	LT 1.34	0.344	....	....	LT 0.05
06/01/88	UB	LT 7.46	0.29	LT 5.00	4.01	LT 1.34	0.113	....	....	LT 0.05
06/08/88	UB	LT 7.46	LT 0.20	LT 5.00	2.35	LT 1.34	0.083	....	....	LT 0.05
06/15/88	UB	LT 7.46	LT 0.20	LT 5.00	3.09	LT 1.34	0.368	....	....	LT 0.05
06/22/88	UB	LT 7.46	LT 0.20	LT 5.00	1.07	LT 1.34	0.125	....	....	LT 0.05
06/29/88	UB	LT 7.46	LT 0.20	LT 5.00	....	LT 1.34	0.293	....	....	LT 0.05
07/06/88	UB	....	....	LT 5.00	....	....	....	....	....	....
07/13/88	UB	LT 7.46	....	....	....	LT 1.34	0.320	....	....	LT 0.05
07/20/88	UB	LT 7.46	LT 0.20	LT 5.00	3.84	LT 1.34	0.333	....	....	LT 0.05
07/27/88	UB	LT 7.46	LT 0.20	LT 5.00	4.65	LT 1.34	0.280	....	....	0.21
08/03/88	UB	LT 7.46	LT 0.20	LT 5.00	4.73	LT 1.34	0.352	....	....	LT 0.05
08/10/88	UB	....	....	....	....	....	....	....	....	....
08/17/88	UB	LT 7.46	LT 0.20	LT 5.00	4.54	LT 1.34	0.057	....	....	LT 0.05
08/24/88	UB	....	....	....	....	....	....	....	....	....
08/31/88	UB	LT 7.46	LT 0.20	LT 5.00	4.51	LT 1.34	LT 0.050	....	....	LT 0.05
09/07/88	UB	8.97	LT 0.20	LT 5.00	....	....	0.425	....	....	LT 0.05
09/14/88	UB	LT 7.46	....	LT 5.00	4.89	LT 1.34	0.374	....	....	LT 0.05
09/21/88	UB	LT 7.46	LT 0.20	....	4.11	LT 1.34	0.331	....	....	LT 0.05
09/28/88	UB	....	LT 0.20	LT 5.00	4.09	LT 1.34	0.321	....	....	LT 0.05

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED

ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTHWEST BOUNDARY TREATMENT PLANT - INFLUENT FOR FY 88

SAMPLE DATE	ORG	ETC6H5 ug/l	FLUORIDE mg/l	HCCPD ug/l	ISODR ug/l	MEC6H5 ug/l	MIBK ug/l	M-XYLENE ug/l	O,P-XYLEN ug/l	OXAT ug/l
10/07/87	ES	....	2.08	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
10/14/87	ES	....	9.35	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
10/21/87	ES	....	1.10	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
10/28/87	ES	....	2.93	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
11/04/87	ES	LT 0.62	9.95	LT 0.083	LT 0.056	LT 2.10	LT 12.90	LT 1.04	LT 1.34	LT 1.3
11/12/87	ES	....	1.02	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
11/18/87	ES	....	1.45	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
11/25/87	ES	....	....	....	....	....	....	....	....	....
12/02/87	ES	....	1.61	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
12/09/87	ES	LT 0.62	1.62	LT 0.083	LT 0.056	LT 2.10	LT 12.90	LT 1.04	LT 1.34	LT 1.3
12/16/87	ES	....	1.43	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
12/23/87	ES	....	....	....	....	....	....	....	....	....
12/30/87	ES	....	....	....	....	....	....	....	....	....
01/06/88	ES	....	1.35	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
01/13/88	ES	....	1.39	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
01/20/88	ES	LT 0.62	1.47	LT 0.083	LT 0.056	LT 2.10	LT 12.90	LT 1.04	LT 1.34	LT 1.3
01/28/88	ES	....	1.51	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
02/03/88	ES	....	1.38	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
02/10/88	ES	....	1.42	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
02/17/88	ES	LT 0.62	1.24	LT 0.083	LT 0.056	LT 2.10	LT 12.90	LT 1.04	LT 1.34	LT 1.3
02/24/88	RM	....	1.50	....	LT 0.200	LT 1.00	....	....	....	LT 20.0
03/02/88	RM	....	1.70	....	LT 0.200	LT 1.00	....	....	....	LT 20.0
03/09/88	RM	....	1.60	....	LT 0.200	LT 1.00	....	....	....	LT 20.0
03/14/88	RM	....	1.40	....	LT 0.200	LT 1.00	....	....	....	LT 20.0
03/21/88	RM	....	1.50	....	LT 0.200	LT 1.00	....	....	....	LT 20.0
03/30/88	RM	....	1.60	....	LT 0.200	LT 1.00	....	....	....	LT 20.0
04/05/88	RM	....	1.70	....	LT 0.200	LT 1.00	....	....	....	LT 20.0
04/13/88	UB	....	2.31	....	0.071	....	....	....	....	LT 2.3
04/22/88	UB	....	2.12	....	LT 0.051	....	....	....	....	LT 2.3
04/27/88	UB	....	2.80	....	0.062	....	....	....	....	LT 2.3
05/04/88	UB	....	....	....	LT 0.051	....	....	....	....	LT 2.3
05/11/88	UB	....	2.65	....	LT 0.051	....	....	....	....	LT 2.3
05/18/88	UB	....	2.52	....	LT 0.051	....	....	....	....	LT 2.3
05/25/88	UB	....	2.24	....	LT 0.051	....	....	....	....	LT 2.3
06/01/88	UB	....	2.83	....	LT 0.051	....	....	....	....	LT 2.3
06/08/88	UB	....	2.17	....	LT 0.051	....	....	....	....	LT 2.3
06/15/88	UB	....	2.42	....	LT 0.051	....	....	....	....	LT 2.3
06/22/88	UB	....	2.27	....	LT 0.051	....	....	....	....	LT 2.3
06/29/88	UB	....	2.38	....	LT 0.051	....	....	....	....	LT 2.3
07/06/88	UB	....	....	....	....	....	....	....	....	....
07/13/88	UB	....	....	....	LT 0.051	....	....	....	....	LT 2.3
07/20/88	UB	....	2.32	....	LT 0.051	....	....	....	....	LT 2.3
07/27/88	UB	....	2.15	....	LT 0.051	....	....	....	....	LT 2.3
08/03/88	UB	....	2.53	....	LT 0.051	....	....	....	....	LT 2.3
08/10/88	UB	....	....	....	....	....	....	....	....	....
08/17/88	UB	....	2.48	....	LT 0.051	....	....	....	....	LT 2.3
08/24/88	UB	....	....	....	....	....	....	....	....	LT 2.3
08/31/88	UB	....	2.59	....	LT 0.051	....	....	....	....	....
09/07/88	UB	....	2.41	....	LT 0.051	....	....	....	....	LT 2.3
09/14/88	UB	....	2.56	....	LT 0.051	....	....	....	....	LT 2.3
09/21/88	UB	....	2.55	....	LT 0.051	....	....	....	....	LT 2.3
09/28/88	UB	....	2.53	....	LT 0.051	....	....	....	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED

ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTHWEST BOUNDARY TREATMENT PLANT - INFLUENT FOR FY 88

SAMPLE DATE	ORG	PPDDE ug/l	PPDDT ug/l	SO4 mg/l	T12DCE ug/l	TCLEE ug/l	TRCLE ug/l
10/07/87	ES	LT 0.046	LT 0.059	168	....	....	....
10/14/87	ES	LT 0.046	LT 0.059	161	....	....	....
10/21/87	ES	LT 0.046	LT 0.059	193	....	....	....
10/28/87	ES	LT 0.046	LT 0.059	....	....	....	....
11/04/87	ES	LT 0.046	LT 0.059	154	LT 1.80	LT 2.80	LT 1.30
11/12/87	ES	LT 0.046	LT 0.059	148	....	....	....
11/18/87	ES	LT 0.046	LT 0.059	173	....	....	....
11/25/87	ES	....	....	....	....	....	....
12/02/87	ES	LT 0.046	LT 0.059	157	....	....	....
12/09/87	ES	LT 0.046	LT 0.059	171	LT 1.80	LT 2.80	LT 1.30
12/16/87	ES	LT 0.046	LT 0.059	164	....	....	....
12/23/87	ES	....	....	....	....	....	....
12/30/87	ES	....	....	....	....	....	....
01/06/88	ES	LT 0.046	LT 0.059	168	....	....	....
01/13/88	ES	LT 0.046	LT 0.059	146	....	....	....
01/20/88	ES	LT 0.046	LT 0.059	171	LT 1.80	LT 2.80	LT 1.30
01/28/88	ES	LT 0.046	LT 0.059	158	....	....	....
02/03/88	ES	LT 0.046	LT 0.059	161	....	....	....
02/10/88	ES	LT 0.046	LT 0.059	152	....	....	....
02/17/88	ES	LT 0.046	LT 0.059	149	LT 1.80	LT 2.80	LT 1.30
02/24/88	RM	....	....	....	....	LT 1.00	LT 1.00
03/02/88	RM	....	....	....	....	LT 1.00	LT 1.00
03/09/88	RM	....	....	....	....	LT 1.00	LT 1.00
03/14/88	RM	....	....	....	....	LT 1.00	LT 1.00
03/21/88	RM	....	....	....	....	LT 1.00	LT 1.00
03/30/88	RM	....	....	....	....	LT 1.00	LT 1.00
04/05/88	RM	....	....	....	....	LT 1.00	LT 1.00
04/13/88	UB	....	....	....	....	....	LT 0.56
04/22/88	UB	....	....	....	....	....	LT 0.56
04/27/88	UB	....	....	....	....	....	LT 0.56
05/04/88	UB	....	....	....	....	....	LT 0.56
05/11/88	UB	....	....	....	....	....	LT 0.56
05/18/88	UB	....	....	....	....	....	LT 0.56
05/25/88	UB	....	....	....	....	....	LT 0.56
06/01/88	UB	....	....	....	....	....	LT 0.56
06/08/88	UB	....	....	....	....	....	LT 0.56
06/15/88	UB	....	....	....	....	....	LT 0.56
06/22/88	UB	....	....	....	....	....	LT 0.56
06/29/88	UB	....	....	....	....	....	LT 0.56
07/06/88	UB	....	....	....	....	....	....
07/13/88	UB	....	....	....	....	....	....
07/20/88	UB	....	....	....	....	....	LT 0.56
07/27/88	UB	....	....	....	....	....	LT 0.56
08/03/88	UB	....	....	....	....	....	LT 0.56
08/10/88	UB	....	....	....	....	....	....
08/17/88	UB	....	....	....	....	....	LT 0.56
08/24/88	UB	....	....	....	....	....	....
08/31/88	UB	....	....	....	....	....	LT 0.56
09/07/88	UB	....	....	....	....	....	LT 0.56
09/14/88	UB	....	....	....	....	....	LT 0.56
09/21/88	UB	....	....	....	....	....	....
09/28/88	UB	....	....	....	....	....	LT 0.56

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED

ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTHWEST BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 88

SAMPLE DATE	ORG.	111TCE ug/l	112TCE ug/l	11DCE ug/l	11DCLE ug/l	12DCE ug/l	12DCLE ug/l	ALDRN ug/l	AS ug/l	BTZ ug/l
10/07/87	ES	....	....	....	....	....	....	LT 0.083	....	....
10/14/87	ES	....	....	....	....	....	....	LT 0.083	....	....
10/21/87	ES	....	....	....	....	....	....	LT 0.083	....	....
10/28/87	ES	....	....	....	....	....	....	LT 0.083	....	....
11/04/87	ES	LT 1.09	LT 1.63	LT 1.85	LT 1.93	....	LT 2.07	LT 0.083	LT 2.52	LT 1.10
11/12/87	ES	....	....	....	....	....	....	LT 0.083	....	....
11/18/87	ES	....	....	....	....	....	....	LT 0.083	....	....
11/25/87	ES	....	....	....	....	....	....	....	....	....
12/02/87	ES	....	....	....	....	....	....	LT 0.083	....	....
12/09/87	ES	LT 1.09	LT 1.63	LT 1.85	LT 1.93	....	LT 2.07	LT 0.083	LT 2.52	LT 1.10
12/16/87	ES	....	....	....	....	....	....	LT 0.083	....	....
12/23/87	ES	....	....	....	....	....	....	....	....	....
12/30/87	ES	....	....	....	....	....	....	....	....	....
01/06/88	ES	....	....	....	....	....	....	LT 0.083	....	....
01/13/88	ES	....	....	....	....	....	....	LT 0.083	....	....
01/20/88	ES	LT 1.09	LT 1.63	LT 1.85	LT 1.93	....	LT 2.07	LT 0.083	LT 2.52	LT 1.10
01/28/88	ES	....	....	....	....	....	....	LT 0.083	....	....
02/03/88	ES	....	....	....	....	....	....	....	....	....
02/10/88	ES	....	....	....	....	....	....	LT 0.083	....	....
02/17/88	ES	LT 1.09	LT 1.63	LT 1.85	LT 1.93	....	LT 2.07	LT 0.083	LT 2.52	LT 1.10
02/24/88	RM	....	....	....	....	LT 1.00	LT 1.00	LT 0.200	....	....
03/02/88	RM	....	....	....	....	LT 1.00	LT 1.00	LT 0.200	....	....
03/09/88	RM	....	....	....	....	LT 1.00	LT 1.00	LT 0.200	....	....
03/14/88	RM	....	....	....	....	LT 1.00	LT 1.00	LT 0.200	....	....
03/21/88	RM	....	....	....	....	LT 1.00	LT 1.00	LT 0.200	....	....
03/30/88	RM	....	....	....	....	LT 1.00	LT 1.00	LT 0.200	....	....
04/05/88	RM	....	....	....	....	LT 1.00	LT 1.00	LT 0.200	....	....
04/13/88	UB	....	....	....	....	....	....	LT 0.050	....	....
04/22/88	UB	....	....	....	....	....	....	LT 0.050	....	....
04/27/88	UB	....	....	....	....	....	....	0.062	....	....
05/04/88	UB	....	....	....	....	....	....	LT 0.050	....	....
05/11/88	UB	....	....	....	....	....	....	0.059	....	....
05/18/88	UB	....	....	....	....	....	....	LT 0.050	....	....
05/25/88	UB	....	....	....	....	....	....	LT 0.050	....	....
06/01/88	UB	....	....	....	....	....	....	LT 0.050	....	....
06/08/88	UB	....	....	....	....	....	....	LT 0.050	....	....
06/15/88	UB	....	....	....	....	....	....	LT 0.050	....	....
06/22/88	UB	....	....	....	....	....	....	LT 0.050	....	....
06/29/88	UB	....	....	....	....	....	....	LT 0.050	....	....
07/06/88	UB	....	....	....	....	....	....	....	....	....
07/13/88	UB	....	....	....	....	....	....	LT 0.050	....	....
07/20/88	UB	....	....	....	....	....	....	LT 0.050	....	....
07/27/88	UB	....	....	....	....	....	....	LT 0.050	....	....
08/03/88	UB	....	....	....	....	....	....	LT 0.050	....	....
08/10/88	UB	....	....	....	....	....	....	....	....	....
08/17/88	UB	....	....	....	....	....	....	LT 0.050	....	....
08/24/88	UB	....	....	....	....	....	....	LT 0.050	....	....
08/31/88	UB	....	....	....	....	....	....	....	....	....
09/07/88	UB	....	....	....	....	....	....	LT 0.050	....	....
09/14/88	UB	....	....	....	....	....	....	LT 0.050	....	....
09/21/88	UB	....	....	....	....	....	....	LT 0.050	....	....
09/28/88	UB	....	....	....	....	....	....	LT 0.050	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED

ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTHWEST BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 88

SAMPLE DATE	ORG.	C6H6 ug/l	CCL4 ug/l	CH2CL2 ug/l	CHCL3 ug/l	CHLORIDE mg/l	CLC6H5 ug/l	CLDAN ug/l	CPMS ug/l	CPMSO ug/l
10/07/87	ES	....	....	....	....	297	....	LT 0.152	....	....
10/14/87	ES	....	....	....	....	368	....	LT 0.152	....	....
10/21/87	ES	....	....	....	....	414	....	LT 0.152	....	....
10/28/87	ES	....	....	....	....	346	....	LT 0.152	....	....
11/04/87	ES	LT 1.92	LT 1.69	LT 2.48	19.90	321	LT 1.36	LT 0.152	LT 1.08	LT 1.98
11/12/87	ES	....	....	....	....	349	....	LT 0.152	....	....
11/18/87	ES	....	....	....	....	363	....	LT 0.152	....	....
11/25/87	ES	....	....	....	....	....	....	....	....	....
12/02/87	ES	....	....	....	....	376	....	LT 0.152	....	....
12/09/87	ES	LT 1.92	LT 1.69	LT 2.48	19.80	369	LT 1.36	LT 0.152	LT 1.08	LT 1.98
12/16/87	ES	....	....	....	....	349	....	LT 0.152	....	....
12/23/87	ES	....	....	....	....	....	....	....	....	....
12/30/87	ES	....	....	....	....	....	....	....	....	....
01/06/88	ES	....	....	....	....	361	....	LT 0.152	....	....
01/13/88	ES	....	....	....	....	327	....	LT 0.152	....	....
01/20/88	ES	LT 1.92	LT 1.69	LT 2.48	25.80	342	LT 1.36	LT 0.152	LT 1.08	LT 1.98
01/28/88	ES	....	....	....	....	330	....	LT 0.152	....	....
02/03/88	ES	....	....	....	....	....	....	....	....	....
02/10/88	ES	....	....	....	....	344	....	LT 0.152	....	....
02/17/88	ES	LT 1.92	LT 1.69	LT 2.48	26.30	342	LT 1.36	LT 0.152	LT 1.08	LT 1.98
02/24/88	RM	....	LT 1.00	....	30.00	375	....	....	LT 20.00	LT 20.00
03/02/88	RM	....	LT 1.00	....	30.00	368	....	....	LT 20.00	LT 20.00
03/09/88	RM	....	LT 1.00	....	30.00	400	....	....	LT 20.00	LT 20.00
03/14/88	RM	....	LT 1.00	....	30.00	400	....	....	LT 20.00	LT 20.00
03/21/88	RM	....	LT 1.00	....	30.00	....	....	....	LT 20.00	LT 20.00
03/30/88	RM	....	LT 1.00	....	30.00	400	....	....	LT 20.00	LT 20.00
04/05/88	RM	....	LT 1.00	....	30.00	378	....	....	LT 20.00	LT 20.00
04/13/88	UB	....	....	....	....	390	....	....	LT 5.69	LT 11.50
04/22/88	UB	....	....	....	....	310	....	....	LT 5.69	LT 11.50
04/27/88	UB	....	....	....	....	320	....	....	LT 5.69	LT 11.50
05/04/88	UB	....	....	....	....	....	....	....	LT 5.69	LT 11.50
05/11/88	UB	....	....	....	....	380	....	....	LT 5.69	LT 11.50
05/18/88	UB	....	....	....	....	380	....	....	LT 5.69	LT 11.50
05/25/88	UB	....	....	....	....	290	....	....	LT 5.69	LT 11.50
06/01/88	UB	....	....	....	....	330	....	....	LT 5.69	LT 11.50
06/08/88	UB	....	....	....	....	290	....	....	LT 5.69	LT 11.50
06/15/88	UB	....	....	....	....	310	....	....	LT 5.69	LT 11.50
06/22/88	UB	....	....	....	....	350	....	....	LT 5.69	LT 11.50
06/29/88	UB	....	....	....	....	360	....	....	LT 5.69	LT 11.50
07/06/88	UB	....	....	....	....	....	....	....	....	
07/13/88	UB	....	....	....	....	....	....	....	LT 5.69	LT 11.50
07/20/88	UB	....	....	....	....	310	....	....	LT 5.69	LT 11.50
07/27/88	UB	....	....	....	....	720	....	....	LT 5.69	LT 11.50
08/03/88	UB	....	....	....	....	320	....	....	LT 5.69	LT 11.50
08/10/88	UB	....	....	....	....	....	....	....	....	....
08/17/88	UB	....	....	....	....	....	....	....	LT 5.69	LT 11.50
08/24/88	UB	....	....	....	....	....	....	....	....	....
08/31/88	UB	....	....	....	....	300	....	....	LT 5.69	LT 11.50
09/07/88	UB	....	....	....	....	320	....	....	LT 5.69	LT 11.50
09/14/88	UB	....	....	....	....	380	....	....	LT 5.69	LT 11.50
09/21/88	UB	....	....	....	....	380	....	....	LT 5.69	LT 11.50
09/28/88	UB	....	....	....	....	360	....	....	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED

ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTHWEST BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 88

SAMPLE DATE	ORG.	CPMSO2 ug/l	DBCP ug/l	DBCP ug/l	DIMP ug/l	DITH ug/l	DLDRN ug/l	DMDS ug/l	DMMP ug/l	ENDRN ug/l
10/07/87	ES	....	LT 0.13	LT 9.31	LT 10.10	....	LT 0.054	....	LT 16.30	LT 0.06
10/14/87	ES	....	LT 0.13	LT 9.31	LT 10.10	....	LT 0.054	....	LT 16.30	LT 0.06
10/21/87	ES	....	LT 0.13	LT 9.31	LT 10.10	....	LT 0.054	....	LT 16.30	LT 0.06
10/28/87	ES	....	LT 0.13	LT 9.31	LT 10.10	....	LT 0.054	....	LT 16.30	LT 0.06
11/04/87	ES	LT 2.24	LT 0.13	LT 9.31	LT 10.10	LT 3.34	LT 0.054	LT 1.16	LT 16.30	LT 0.06
11/12/87	ES	....	LT 0.13	LT 9.31	LT 10.10	LT 3.34	LT 0.054	....	LT 16.30	LT 0.06
11/18/87	ES	....	LT 0.13	LT 9.31	LT 10.10	....	LT 0.054	....	LT 16.30	LT 0.06
11/25/87	ES	....	....	....	....	....	....	....	....	....
12/02/87	ES	....	LT 0.13	LT 9.31	LT 10.10	....	LT 0.054	....	LT 16.30	LT 0.06
12/09/87	ES	LT 2.24	LT 0.13	LT 9.31	LT 10.10	....	LT 0.054	LT 1.16	LT 16.30	LT 0.06
12/16/87	ES	....	LT 0.13	LT 9.31	LT 10.10	....	LT 0.054	....	LT 16.30	LT 0.06
12/23/87	ES	....	....	....	....	....	....	....	....	....
12/30/87	ES	....	....	....	....	....	....	....	....	....
01/06/88	ES	....	LT 0.13	LT 9.31	LT 10.10	....	LT 0.054	....	LT 16.30	LT 0.06
01/13/88	ES	....	LT 0.13	LT 9.31	LT 10.10	....	LT 0.054	....	LT 16.30	LT 0.06
01/20/88	ES	LT 2.24	LT 0.13	LT 9.31	LT 10.10	LT 3.34	LT 0.054	LT 1.16	LT 16.30	LT 0.06
01/28/88	ES	....	LT 0.13	LT 9.31	LT 10.10	....	LT 0.054	....	LT 16.30	LT 0.06
02/03/88	ES	....	LT 0.13	LT 9.31	LT 10.10	....	....	....	LT 16.30	
02/10/88	ES	....	LT 0.13	LT 9.31	LT 10.10	....	LT 0.054	....	LT 16.30	LT 0.06
02/17/88	ES	LT 2.24	LT 0.13	LT 9.31	13.60	LT 3.34	LT 0.054	LT 1.16	LT 16.30	LT 0.06
02/24/88	RM	LT 20.00	LT 0.20	LT 1.00	LT 10.00	LT 20.00	LT 0.200	....	....	LT 0.20
03/02/88	RM	LT 20.00	LT 0.20	LT 1.00	LT 10.00	LT 20.00	LT 0.200	....	....	LT 0.20
03/09/88	RM	LT 20.00	LT 0.20	LT 1.00	LT 10.00	LT 20.00	LT 0.200	....	....	LT 0.20
03/14/88	RM	LT 20.00	LT 0.20	LT 1.00	LT 10.00	LT 20.00	LT 0.200	....	....	LT 0.20
03/21/88	RM	LT 20.00	LT 0.20	LT 1.00	LT 10.00	LT 20.00	LT 0.200	....	....	LT 0.20
03/30/88	RM	LT 20.00	LT 0.20	LT 1.00	LT 10.00	LT 20.00	LT 0.200	....	....	LT 0.20
04/05/88	RM	LT 20.00	LT 0.20	LT 1.00	LT 10.00	LT 20.00	LT 0.200	....	....	LT 0.20
04/13/88	UB	LT 7.46	LT 0.20	LT 5.00	3.14	LT 1.34	LT 0.050	....	....	LT 0.05
04/22/88	UB	LT 7.46	LT 0.20	LT 5.00	1.50	LT 1.34	LT 0.050	....	....	LT 0.05
04/27/88	UB	LT 7.46	LT 0.20	LT 5.00	2.81	LT 1.34	LT 0.050	....	....	LT 0.05
05/04/88	UB	LT 7.46	LT 0.20	LT 5.00	3.08	LT 1.34	LT 0.050	....	....	LT 0.05
05/11/88	UB	LT 7.46	LT 0.20	LT 5.00	LT 0.65	LT 1.34	LT 0.050	....	....	LT 0.05
05/18/88	UB	LT 7.46	LT 0.20	LT 5.00	3.32	LT 1.34	LT 0.050	....	....	LT 0.05
05/25/88	UB	LT 7.46	LT 0.20	LT 5.00	3.34	LT 1.34	LT 0.050	....	....	LT 0.05
06/01/88	UB	LT 7.46	0.29	LT 5.00	1.62	LT 1.34	LT 0.050	....	....	LT 0.05
06/08/88	UB	LT 7.46	LT 0.20	LT 5.00	3.15	LT 1.34	LT 0.050	....	....	LT 0.05
06/15/88	UB	LT 7.46	LT 0.20	LT 5.00	3.46	LT 1.34	LT 0.050	....	....	LT 0.05
06/22/88	UB	LT 7.46	LT 0.20	LT 5.00	3.84	LT 1.34	LT 0.050	....	....	LT 0.05
06/29/88	UB	LT 7.46	LT 0.20	LT 5.00	....	LT 1.34	LT 0.050	....	....	LT 0.05
07/06/88	UB	....	....	....	....	....	....	....	....	....
07/13/88	UB	LT 7.46	....	LT 5.00	....	LT 1.34	LT 0.050	....	....	LT 0.05
07/20/88	UB	LT 7.46	LT 0.20	LT 5.00	5.00	LT 1.34	LT 0.050	....	....	LT 0.05
07/27/88	UB	LT 7.46	LT 0.20	LT 5.00	4.77	LT 1.34	LT 0.050	....	....	LT 0.05
08/03/88	UB	LT 7.46	LT 0.20	LT 5.00	5.01	LT 1.34	LT 0.050	....	....	LT 0.05
08/10/88	UB	....	....	....	....	....	....	....	....	....
08/17/88	UB	LT 7.46	LT 0.20	LT 5.00	4.22	LT 1.34	LT 0.050	....	....	LT 0.05
08/24/88	UB	....	....	....	....	....	....	....	....	....
08/31/88	UB	LT 7.46	LT 0.20	LT 5.00	5.53	LT 1.34	LT 0.050	....	....	LT 0.05
09/07/88	UB	LT 7.46	LT 0.20	LT 5.00	4.81	LT 1.34	LT 0.050	....	....	LT 0.05
09/14/88	UB	LT 7.46	LT 0.20	LT 5.00	6.23	LT 1.34	LT 0.050	....	....	LT 0.05
09/21/88	UB	LT 7.46	LT 0.20	LT 5.00	5.09	LT 1.34	LT 0.050	....	....	LT 0.05
09/28/88	UB	....	....	....	....	....	LT 0.050	....	....	LT 0.05

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED

ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTHWEST BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 88

SAMPLE DATE	ORG.	ETC6H5 ug/l	FLUORIDE mg/l	HCCPD ug/l	ISODR ug/l	MEC6H5 ug/l	MIBK ug/l	M-XYLENE ug/l	O,P-XYLENE ug/l	OXAT ug/l
10/07/87	ES	....	2.17	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
10/14/87	ES	....	9.38	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
10/21/87	ES	....	1.24	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
10/28/87	ES	....	1.14	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
11/04/87	ES	LT 0.62	1.02	LT 0.083	LT 0.056	LT 2.10	LT 12.90	LT 1.04	LT 1.34	LT 1.35
11/12/87	ES	....	9.94	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
11/18/87	ES	....	1.44	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
11/25/87	ES	....	....	....	....	....	....	....	....	....
12/02/87	ES	....	1.78	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
12/09/87	ES	LT 0.62	1.62	LT 0.083	LT 0.056	LT 2.10	LT 12.90	LT 1.04	LT 1.34	LT 1.35
12/16/87	ES	....	1.39	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
12/23/87	ES	....	....	....	....	....	....	....	....	....
12/30/87	ES	....	....	....	....	....	....	....	....	....
01/06/88	ES	....	1.52	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
01/13/88	ES	....	1.39	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
01/20/88	ES	LT 0.62	1.42	LT 0.083	LT 0.056	LT 2.10	LT 12.90	LT 1.04	LT 1.34	LT 1.35
01/28/88	ES	....	1.51	LT 0.083	LT 0.056	....	LT 12.90	....	....	....
02/03/88	ES	....		LT 0.083	LT 0.056	....	LT 12.90	....	....	....
02/10/88	ES	....	1.30	LT 0.083	....	....	LT 12.90	....	....	....
02/17/88	ES	LT 0.62	1.23	....	LT 0.056	LT 2.10	LT 12.90	LT 1.04	LT 1.34	LT 1.35
02/24/88	RM	....	1.50	....	LT 0.200	LT 1.00	....	....	....	LT 20.00
03/02/88	RM	....	1.50	....	LT 0.200	LT 1.00	....	....	....	LT 20.00
03/09/88	RM	....	1.50	....	LT 0.200	LT 1.00	....	....	....	LT 20.00
03/14/88	RM	....	1.60	....	LT 0.200	LT 1.00	....	....	....	LT 20.00
03/21/88	RM	....	1.60	....	LT 0.200	LT 1.00	....	....	....	LT 20.00
03/30/88	RM	....	1.70	....	LT 0.200	LT 1.00	....	....	....	LT 20.00
04/05/88	RM	....	1.70	....	LT 0.200	LT 1.00	....	....	....	LT 20.00
04/13/88	UB	....	2.40	....	LT 0.051	....	....	....	....	LT 2.38
04/22/88	UB	....	2.19	....	LT 0.051	....	....	....	....	LT 2.38
04/27/88	UB	....	2.31	....	LT 0.051	....	....	....	....	LT 2.38
05/04/88	UB	....	....	....	LT 0.051	....	....	....	....	LT 2.38
05/11/88	UB	....	2.61	....	LT 0.051	....	....	....	....	LT 2.38
05/18/88	UB	....	2.17	....	LT 0.051	....	....	....	....	LT 2.38
05/25/88	UB	....	2.41	....	LT 0.051	....	....	....	....	LT 2.38
06/01/88	UB	....	2.44	....	LT 0.051	....	....	....	....	LT 2.38
06/08/88	UB	....	2.51	....	LT 0.051	....	....	....	....	LT 2.38
06/15/88	UB	....	2.41	....	LT 0.051	....	....	....	....	LT 2.38
06/22/88	UB	....	2.26	....	LT 0.051	....	....	....	....	LT 2.38
06/29/88	UB	....	2.78	....	LT 0.051	....	....	....	....	LT 2.38
07/06/88	UB	....	....	....	....	....	....	....	....	....
07/13/88	UB	....	....	....	LT 0.051	....	....	....	....	LT 2.38
07/20/88	UB	....	2.88	....	LT 0.051	....	....	....	....	LT 2.38
07/27/88	UB	....	3.42	....	LT 0.051	....	....	....	....	LT 2.38
08/03/88	UB	....	2.48	....	LT 0.051	....	....	....	....	LT 2.38
08/10/88	UB	....	....	....	....	....	....	....	....	....
08/17/88	UB	....	....	....	LT 0.051	....	....	....	....	LT 2.38
08/24/88	UB	....	....	....	....	....	....	....	....	....
08/31/88	UB	....	2.60	....	LT 0.051	....	....	....	....	LT 2.38
09/07/88	UB	....	2.61	....	LT 0.051	....	....	....	....	LT 2.38
09/14/88	UB	....	2.69	....	LT 0.051	....	....	....	....	LT 2.38
09/21/88	UB	....	2.47	....	LT 0.051	....	....	....	....	LT 2.38
09/28/88	UB	....	2.51	....	LT 0.051	....	....	....	....	....

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED

ug/l = MICROGRAM PER LITER mg/l = MILLIGRAM PER LITER

NORTHWEST BOUNDARY TREATMENT PLANT - EFFLUENT FOR FY 88

SAMPLE DATE	ORG.	PPDDE ug/l	PPDDT ug/l	SO4 mg/l	T12DCE ug/l	TCLEE ug/l	TRCLE ug/l
10/07/87	ES	LT 0.046	LT 0.059	170	....	....	....
10/14/87	ES	LT 0.046	LT 0.059	160	....	....	....
10/21/87	ES	LT 0.046	LT 0.059	....	....	....	....
10/28/87	ES	LT 0.046	LT 0.059	839	....	....	....
11/04/87	ES	LT 0.046	LT 0.059	156	LT 1.80	LT 2.80	LT 1.30
11/12/87	ES	LT 0.046	LT 0.059	158	....	....	....
11/18/87	ES	LT 0.046	LT 0.059	174	....	....	....
11/25/87	ES	....	....	....	....	....	....
12/02/87	ES	LT 0.046	LT 0.059	180	....	....	....
12/09/87	ES	LT 0.046	LT 0.059	178	LT 1.80	LT 2.80	LT 1.30
12/16/87	ES	LT 0.046	LT 0.059	163	....	....	....
12/23/87	ES	....	....	....	....	....	....
12/30/87	ES	....	....	....	....	....	....
01/06/88	ES	LT 0.046	LT 0.059	165	....	....	....
01/13/88	ES	LT 0.046	LT 0.059	148	....	....	....
01/20/88	ES	LT 0.046	LT 0.059	162	LT 1.80	LT 2.80	LT 1.30
01/28/88	ES	LT 0.046	LT 0.059	158	....	....	....
02/03/88	ES	....	....	....	....	....	....
02/10/88	ES	LT 0.046	LT 0.059	147	....	....	....
02/17/88	ES	LT 0.046	LT 0.059	151	LT 1.80	LT 2.80	LT 1.30
02/24/88	RM	....	....	....	....	LT 1.00	LT 1.00
03/02/88	RM	....	....	....	....	LT 1.00	LT 1.00
03/09/88	RM	....	....	....	....	LT 1.00	LT 1.00
03/14/88	RM	....	....	....	....	LT 1.00	LT 1.00
03/21/88	RM	....	....	....	....	LT 1.00	LT 1.00
03/30/88	RM	....	....	....	....	LT 1.00	LT 1.00
04/05/88	RM	....	....	....	....	LT 1.00	LT 1.00
04/13/88	UB	....	....	....	....	....	LT 0.56
04/22/88	UB	....	....	....	....	....	LT 0.56
04/27/88	UB	....	....	....	....	....	LT 0.56
05/04/88	UB	....	....	....	....	....	LT 0.56
05/11/88	UB	....	....	....	....	....	LT 0.56
05/18/88	UB	....	....	....	....	....	LT 0.56
05/25/88	UB	....	....	....	....	....	LT 0.56
06/01/88	UB	....	....	....	....	....	....
06/08/88	UB	....	....	....	....	....	LT 0.56
06/15/88	UB	....	....	....	....	....	LT 0.56
06/22/88	UB	....	....	....	....	....	LT 0.56
06/29/88	UB	....	....	....	....	....	LT 0.56
07/06/88	UB	....	....	....	....	....	....
07/13/88	UB	....	....	....	....	....	....
07/20/88	UB	....	....	....	....	....	LT 0.56
07/27/88	UB	....	....	....	....	....	LT 0.56
08/03/88	UB	....	....	....	....	....	LT 0.56
08/10/88	UB	....	....	....	....	....	....
08/17/88	UB	....	....	....	....	....	LT 0.56
08/24/88	UB	....	....	....	....	....	....
08/31/88	UB	....	....	....	....	....	LT 0.56
09/07/88	UB	....	....	....	....	....	LT 0.56
09/14/88	UB	....	....	....	....	....	LT 0.56
09/21/88	UB	....	....	....	....	....	....
09/28/88	UB	....	....	....	....	....	LT 0.56

LT = LESS THAN The Following Concentration .... INDICATES THAT ANALYSIS WAS NOT PERFORMED

RMA
FY 88 STATISTICAL SUMMARY
NORTHWEST BOUNDARY SYSTEM

SITE: PWEFEF

ANALYTE	TOT SAMP	SAMP >CRL	% > CRL	CERTIFIED REPORT. LIMIT (LT)	UOM	MEAN	LOW VALUE	HIGH VALUE
111TCE	4	0	0%	1.09	UGL	LT CRL	LT CRL	LT CRL
112TCE	4	0	0%	1.63	UGL	LT CRL	LT CRL	LT CRL
11DCE	4	0	0%	1.85	UGL	LT CRL	LT CRL	LT CRL
11DCLE	4	0	0%	1.93	UGL	LT CRL	LT CRL	LT CRL
12DCE	7	0	0%	1.00	UGL	LT CRL	LT CRL	LT CRL
12DCLE	11	0	0%	2.07 1.00	UGL	LT CRL	LT CRL	LT CRL
ALDRN	46	2	4%	0.083 0.200 0.050	UGL	LT CRL	LT CRL	0.06
AS	4	0	0%	2.52	UGL	LT CRL	LT CRL	LT CRL
BTZ	4	0	0%	1.10	UGL	LT CRL	LT CRL	LT CRL
C6H6	4	0	0%	1.92	UGL	LT CRL	LT CRL	LT CRL
CCL4	11	0	0%	1.69 1.00	UGL	LT CRL	LT CRL	LT CRL
CH2CL2	4	0	0%	2.48	UGL	LT CRL	LT CRL	LT CRL
CHCL3	11	11	100%		UGL	27.44	19.80	30.00
CL	42	41	98%	720	MGL	359	LT CRL	414
CLC6H5	4	0	0%	1.36	UGL	LT CRL	LT CRL	LT CRL
CLDAN	17	0	0%	0.152	UGL	LT CRL	LT CRL	LT CRL
CPMS	32	0	0%	1.08 20.0 5.69	UGL	LT CRL	LT CRL	LT CRL
CPMSO	32	0	0%	1.98 20.0 11.5	UGL	LT CRL	LT CRL	LT CRL
CPMSO2	32	0	0%	2.24 20.0 7.46	UGL	LT CRL	LT CRL	LT CRL
DBCP	44	1	2%	0.130 0.200 0.195	UGL	LT CRL	LT CRL	0.29
DCPD	45	0	0%	9.31 1.00 5.00	UGL	LT CRL	LT CRL	LT CRL
DIMP	43	19	44%	10.1 10.0 0.650	UGL	LT CRL	LT CRL	13.60
DITH	32	0	0%	3.34 20.0 1.34	UGL	LT CRL	LT CRL	LT CRL
DLDRN	46	0	0%	0.054 0.200 0.050	UGL	LT CRL	LT CRL	LT CRL
DMDS	4	0	0%	1.16	UGL	LT CRL	LT CRL	LT CRL
DMMP	17	0	0%	16.3	UGL	LT CRL	LT CRL	LT CRL
ENDRN	46	0	0%	0.060 0.200 0.050	UGL	LT CRL	LT CRL	LT CRL
ETC6H5	4	0	0%	0.620	UGL	LT CRL	LT CRL	LT CRL
F	43	43	100%		MGL	2.33	1.02	9.94
HCCPD	17	0	0%	0.083	UGL	LT CRL	LT CRL	LT CRL
ISODR	46	0	0%	0.056 0.200 0.051	UGL	LT CRL	LT CRL	LT CRL
MEC6H5	11	0	0%	2.10 1.00	UGL	LT CRL	LT CRL	LT CRL
MIBK	17	0	0%	12.9	UGL	LT CRL	LT CRL	LT CRL
MXYL	4	0	0%	1.04	UGL	LT CRL	LT CRL	LT CRL
OPXYL	4	0	0%	1.34	UGL	LT CRL	LT CRL	LT CRL
OXAT	32	0	0%	1.35 20.0 2.38	UGL	LT CRL	LT CRL	LT CRL
PH	7	7	100%			7.57	7.40	7.80
PPDDE	17	0	0%	0.046	UGL	LT CRL	LT CRL	LT CRL
PPDDT	17	0	0%	0.059	UGL	LT CRL	LT CRL	LT CRL
SO4	16	16	100%		MGL	164	147	184
T12DCE	4	0	0%	1.80	UGL	LT CRL	LT CRL	LT CRL
TCLEE	11	0	0%	2.80 1.00	UGL	LT CRL	LT CRL	LT CRL
TOC	7	0	0%	3.00	MGL	LT CRL	LT CRL	LT CRL
TRCLE	30	0	0%	1.30 1.00 0.560	UGL	LT CRL	LT CRL	LT CRL

RMA
FY 88 STATISTICAL SUMMARY
NORTHWEST BOUNDARY SYSTEM

SITE: PWININ

ANALYTE	TOT SAMP	SAMP >CRL	% > CRL	CERTIFIED REPORT. LIMIT (LT)	UOM	MEAN	LOW VALUE	HIGH VALUE
111TCE	4	0	0%	1.09	UGL	LT CRL	LT CRL	LT CRL
112TCE	4	0	0%	1.63	UGL	LT CRL	LT CRL	LT CRL
11DCE	4	0	0%	1.85	UGL	LT CRL	LT CRL	LT CRL
11DCLE	4	0	0%	1.93	UGL	LT CRL	LT CRL	LT CRL
12DCE	7	1	14%	1.00	UGL	LT CRL	LT CRL	7.00
12DCLE	11	0	0%	2.07 1.00	UGL	LT CRL	LT CRL	LT CRL
ALDRN	46	1	2%	0.083 0.200 0.050	UGL	LT CRL	LT CRL	0.12
AS	4	0	0%	2.52	UGL	LT CRL	LT CRL	LT CRL
BTZ	4	0	0%	1.10	UGL	LT CRL	LT CRL	LT CRL
C6H6	4	0	0%	1.92	UGL	LT CRL	LT CRL	LT CRL
CCL4	11	0	0%	1.69 1.00	UGL	LT CRL	LT CRL	LT CRL
CH2CL2	4	0	0%	2.48	UGL	LT CRL	LT CRL	LT CRL
CHCL3	11	11	100%		UGL	29.75	18.90	40.00
CL	43	43	100%		MGL	345	154	480
CLC6H5	4	0	0%	1.36	UGL	LT CRL	LT CRL	LT CRL
CLDAN	17	0	0%	0.152	UGL	LT CRL	LT CRL	LT CRL
CPMS	32	0	0%	1.08 20.0 5.69	UGL	LT CRL	LT CRL	LT CRL
CPMSO	32	0	0%	1.98 20.0 11.5	UGL	LT CRL	LT CRL	LT CRL
CPMSO2	32	1	3%	2.24 20.0 7.46	UGL	LT CRL	LT CRL	8.97
DBCP	44	1	2%	0.130 0.200 0.195	UGL	LT CRL	LT CRL	0.29
DCPD	45	4	9%	9.31 1.00 5.00	UGL	LT CRL	LT CRL	4.00
DIMP	43	20	47%	10.1 10.0	UGL	LT CRL	LT CRL	11.90
DITH	32	0	0%	3.34 20.0 1.34	UGL	LT CRL	LT CRL	LT CRL
DLDRN	46	44	96%	0.050	UGL	0.33	LT CRL	0.65
DMDS	4	0	0%	1.16	UGL	LT CRL	LT CRL	LT CRL
DMMP	17	0	0%	16.3	UGL	LT CRL	LT CRL	LT CRL
ENDRN	46	11	24%	0.060 0.200 0.050	UGL	LT CRL	LT CRL	0.99
ETC6H5	4	0	0%	0.620	UGL	LT CRL	LT CRL	LT CRL
F	44	44	100%		MGL	2.32	1.02	9.95
HCCPD	17	0	0%	0.083	UGL	LT CRL	LT CRL	LT CRL
ISODR	46	2	4%	0.056 0.200 0.051	UGL	LT CRL	LT CRL	0.07
MEC6H5	11	0	0%	2.10 1.00	UGL	LT CRL	LT CRL	LT CRL
MIBK	17	0	0%	12.9	UGL	LT CRL	LT CRL	LT CRL
MXYL	4	0	0%	1.04	UGL	LT CRL	LT CRL	LT CRL
OPXYL	4	0	0%	1.34	UGL	LT CRL	LT CRL	LT CRL
OXAT	32	0	0%	1.35 20.0 2.38	UGL	LT CRL	LT CRL	LT CRL
PH	7	7	100%			7.70	7.50	7.90
PPDDE	17	0	0%	0.046	UGL	LT CRL	LT CRL	LT CRL
PPDDT	17	0	0%	0.059	UGL	LT CRL	LT CRL	LT CRL
SO4	16	16	100%		MGL	162	146	193
T12DCE	4	0	0%	1.80	UGL	LT CRL	LT CRL	LT CRL
TCLEE	11	0	0%	2.80 1.00	UGL	LT CRL	LT CRL	LT CRL
TOC	7	0	0%	3.00	MGL	LT CRL	LT CRL	LT CRL
TRCLE	31	0	0%	1.30 1.00 0.560	UGL	LT CRL	LT CRL	LT CRL

ROCKY MOUNTAIN ARSENAL

NORTHWEST BOUNDARY TREATMENT SYSTEM

GC/MS ANALYTICAL DATA

LABORATORY: ESE

		DATE:	01/13/88	01/13/88
ANALYTE	CODE	UNITS	PWININ	PWEFEF
1,1,1-TRICHLOROETHANE	111TCE	UGL	LT 5.0	LT 5.0
1,1,2,2-TETRACHLOROETHANE	TCLEA	UGL	LT 5.0	LT 5.0
1,1,2-TRICHLOROETHANE	112TCE	UGL	LT 5.0	LT 5.0
1,1-DICHLOROETHANE	11DCLE	UGL	LT 5.0	LT 5.0
1,1-DICHLOROETHYLENE	11DCE	UGL	LT 5.0	LT 5.0
1,2,4-TRICHLOROBENZENE	124TCB	UGL	LT 10.0	LT 10.0
1,2,-DICHLOROETHYLENE	12DCE	UGL	LT 5.0	LT 5.0
1,2-DICHLOROBENZENE	1D2CLB	UGL	LT 10.0	LT 10.0
1,2-DICHLOROETHANE	12DCLE	UGL	LT 5.0	LT 5.0
1,2-DICHLOROPROPANE	12DCLP	UGL	LT 5.0	LT 5.0
1,3-DICHLOROBENZENE	13DCLB	UGL	LT 10.0	LT 10.0
1,4-DICHLOROBENZENE	14DCLB	UGL	LT 10.0	LT 10.0
2,4,5-TRICHLOROPHENOL	245TCP	UGL	LT 50.0	LT 50.0
2,4,6-TRICHLOROPHENOL	246TCP	UGL	LT 10.0	LT 10.0
2,4-DICHLOROPHENOL	24DCLP	UGL	LT 10.0	LT 10.0
2,4-DIMETHYLPHENOL	24DMPN	UGL	LT 10.0	LT 10.0
2,4-DINITROPHENOL	24DNP	UGL	LT 50.0	LT 50.0
2,4-DINITROTOLUENE	24DNT	UGL	LT 10.0	LT 10.0
2,6-DINITROTOLUENE	26DNT	UGL	LT 10.0	LT 10.0
2-BUTONONE	BUT	UGL	LT 10.0	LT 10.0
2-CHLORONAPHTHALENE	2CNAP	UGL	LT 10.0	LT 10.0
2-CHLOROPHENOL	2CLP	UGL	LT 10.0	LT 10.0
2-METHYLNAPHTHALENE	2MNAP	UGL	LT 10.0	LT 10.0
2-METHYL-4,6-DINITROPHENOL	46DN2C	UGL	LT 50.0	LT 50.0
2-MYTHYLPHENOL	2MP	UGL	LT 10.0	LT 10.0
2-NITROANILINE	?	UGL	LT 50.0	LT 50.0
2-NITROPHENOL	2NP	UGL	LT 10.0	LT 10.0
3,3-DICHLOROBENZIDINE	?	UGL	LT 20.0	LT 20.0
3,METHYL-2-PENTANONE	3M2PNO	UGL	LT 10.0	LT 10.0
3-NITROANILINE	?	UGL	LT 50.0	LT 50.0
4-BROMOPHENYLPHENYL ETHER	4BRPPE	UGL	LT 10.0	LT 10.0
4-CHLOROANILINE	?	UGL	LT 10.0	LT 10.0
4-CHLOROPHENYLPHENYL ETHER	4CLPPE	UGL	LT 10.0	LT 10.0
4-CHLORO-3-METHYLPHENOL	?	UGL	LT 10.0	LT 10.0
4-METHYL PHENOL	4MP	UGL	LT 10.0	LT 10.0
4-NITROANILINE	4NANIL	UGL	LT 50.0	LT 50.0
4-NITROPHENOL	4NP	UGL	LT 50.0	LT 50.0
ACENAPHTENE	ANAPNE	UGL	LT 10.0	LT 10.0
ACENAPHTHYLENE	ANAPYL	UGL	LT 10.0	LT 10.0
ACETONE	ACET	UGL	LT 10.0	LT 10.0
ANTHRACENE	ANTRC	UGL	LT 10.0	LT 10.0
BENZENE	C6H6	UGL	LT 5.0	LT 5.0

ROCKY MOUNTAIN ARSENAL

NORTHWEST BOUNDARY TREATMENT SYSTEM

GC/MS ANALYTICAL DATA

LABORATORY: ESE

		DATE:	01/13/88	01/13/88
ANALYTE	CODE	UNITS	PWININ	PWEFEF
BENZOIC ACID	BENZOA	UGL	LT 50.0	LT 50.0
BENZO(A)ANTHRACENE	BAANTR	UGL	LT 10.0	LT 10.0
BENZO(A)PYRENE	BAPYR	UGL	LT 10.0	LT 10.0
BENZO(B)FLUORANTENE	BBFANT	UGL	LT 10.0	LT 10.0
BENZO(GHI)PERYLENE	?	UGL	LT 10.0	LT 10.0
BENZO(K)FLUORANTHENE	BKFANT	UGL	LT 10.0	LT 10.0
BENZYL ALCOHOL	BZALC	UGL	LT 10.0	LT 10.0
BIS(2-CHLOROETHOXY) METHANE	B2CEXM	UGL	LT 10.0	LT 10.0
BIS(2-CHLOROETHYL) ETHER	B2CLEE	UGL	LT 10.0	LT 10.0
BIS(2-CHLOROISOPROPRYL) ETHER	B2CIPE	UGL	LT 10.0	LT 10.0
BIS(2-ETHYHEXYL) PHTHALATE	B2EHP	UGL	LT 10.0	LT 10.0
BROMODICHLOROMETHANE	BRDCLM	UGL	LT 5.0	LT 5.0
BROMOFORM	CHBR3	UGL	LT 5.0	LT 5.0
BROMOMETHANE	CH3BR	UGL	LT 10.0	LT 10.0
BUTHYLBENZYLPHTHALATE	BBZP	UGL	LT 10.0	LT 10.0
CARBON DISULFIDE	CS2	UGL	LT 5.0	LT 5.0
CARBON TETRACHLORIDE	CCL4	UGL	LT 5.0	LT 5.0
CHLOROBENZENE	CLC6H5	UGL	LT 5.0	LT 5.0
CHLOROETHANE	C2H5CL	UGL	LT 10.0	LT 10.0
CHLOROFORM	CHCL3	UGL	24.0	LT 5.0
CHLOROMETHANE	CH3CL	UGL	LT 10.0	LT 10.0
CHRYSENE	CHRY	UGL	LT 10.0	LT 10.0
CIS-1,3-DICHLOROPROPYLENE	C13DCP	UGL	LT 10.0	LT 10.0
DIBENZOFURAN	DBZFUR	UGL	LT 10.0	LT 10.0
DIBENZO(A,H)ANTHRACENE	DBAHA	UGL	LT 10.0	LT 10.0
DIBROMOCHLOROMETHANE	DBRCLM	UGL	LT 5.0	LT 5.0
DIMETHYL PHTHALATE	DMP	UGL	LT 10.0	LT 10.0
DIMETHYL PTHALATE	?	UGL	LT 10.0	LT 10.0
DIOCTYPHTHALATE	?	UGL	LT 10.0	LT 10.0
DI-N-BUTYL PHTHALATE	DNBP	UGL	LT 10.0	LT 10.0
ETHYLBENZENE	ETC6H5	UGL	LT 5.0	LT 5.0
FLUORANTHENE	FANT	UGL	LT 10.0	LT 10.0
FLUORENE	FLRENE	UGL	LT 10.0	LT 10.0
HEXACHLOROBENZENE	CL6CB	UGL	LT 10.0	LT 10.0
HEXACHLOROBUTADIENE	HCBD	UGL	LT 10.0	LT 10.0
HEXACHLOROCYCLOPENTADIENE	CL6CP	UGL	LT 10.0	LT 10.0
HEXACHLOROETHANE	CL6ET	UGL	LT 10.0	LT 10.0
INDENO(1,2,3-C,D)PYRENE	ICDPRY	UGL	LT 10.0	LT 10.0
ISOPHORONE	ISOPHR	UGL	LT 10.0	LT 10.0
METHYLENE CHLORIDE	CH2CL2	UGL	LT 5.0	LT 5.0
NAPHTHALENE	NAP	UGL	LT 10.0	LT 10.0
NITROBENZENE	NB	UGL	LT 10.0	LT 10.0

ROCKY MOUNTAIN ARSENAL

NORTHWEST BOUNDARY TREATMENT SYSTEM

GC/MS ANALYTICAL DATA

LABORATORY: ESE

		DATE:	01/13/88	01/13/88
ANALYTE	CODE	UNITS	PWININ	PWEFEF
N-NITROSODI-N-PROPYLAMINE	NNDNPA	UGL	LT 10.0	LT 10.0
N-NITROSOPENTLYISOPENTYLAMINE	NNPIPA	UGL	LT 10.0	LT 10.0
PENTACHLOROPHENOL	PCP	UGL	LT 50.0	LT 50.0
PHENANTHRENE	PHANTR	UGL	LT 10.0	LT 10.0
PHENOL	PHENOL	UGL	LT 10.0	LT 10.0
PYRENE	PYR	UGL	LT 10.0	LT 10.0
STYRENE	STYR	UGL	LT 5.0	LT 5.0
TETRACHLOROETHYLENE	TCLEE	UGL	LT 5.0	LT 5.0
TOLUENE	MEC6H5	UGL	LT 5.0	LT 5.0
TRANS-1,3-DICHLOROPROPENE	T13DCP	UGL	LT 5.0	LT 5.0
TRICHLOROETHYLENE	TRCLE	UGL	LT 5.0	LT 5.0
VINYL ACETATE	?	UGL	LT 10.0	LT 10.0
VINYL CHLORIDE	C2H3CL	UGL	LT 10.0	LT 10.0
XYLENES, TOTAL	XYLEN	UGL	LT 5.0	LT 5.0
?-HEXANONE	?	UGL	LT 10.0	LT 10.0

APPENDIX C
DEWATERING WELL DATA

USER NO.	ORG.	SAMPLE DATE	ANALYTE	MTH NO.	BL	CONC.	UOM
PWDW01	UB	88139	ALDRN	KK8	LT	0.050	UGL
	UB	88258	ALDRN	KK8	LT	0.050	UGL
	UB	88139	CL	HH8A		250	MGL
	UB	88258	CL	HH8A		270	MGL
	UB	88139	CPMS	AAA8	LT	5.690	UGL
	UB	88139	CPMSO	AAA8	LT	11.500	UGL
	UB	88139	CPMSO2	AAA8	LT	7.460	UGL
	UB	88139	DBCP	AY8	LT	0.195	UGL
	UB	88139	DCPD	P8	LT	5.000	UGL
	UB	88258	DCPD	P8	LT	5.000	UGL
	UB	88139	DIMP	AW8A	LT	0.650	UGL
	UB	88258	DIMP	AW8A	LT	0.650	UGL
	UB	88139	DLDRN	KK8		0.258	UGL
	UB	88258	DLDRN	KK8		0.297	UGL
	UB	88139	ENDRN	KK8	LT	0.050	UGL
	UB	88258	ENDRN	KK8	LT	0.050	UGL
	UB	88139	F	HH8A		1.470	MGL
	UB	88258	F	HH8A		1.700	MGL
PWDW02	UB	88125	ALDRN	KK8		0.062	UGL
	UB	88258	ALDRN	KK8	LT	0.050	UGL
	UB	88258	CL	HH8A		220	MGL
	UB	88125	CPMS	AAA8	LT	5.690	UGL
	UB	88125	CPMSO	AAA8	LT	11.500	UGL
	UB	88125	CPMSO2	AAA8	LT	7.460	UGL
	UB	88125	DBCP	AY8	LT	0.195	UGL
	UB	88125	DCPD	P8	LT	5.000	UGL
	UB	88258	DCPD	P8	LT	5.000	UGL
	UB	88125	DIMP	AW8A		1.330	UGL
	UB	88258	DIMP	AW8A		0.961	UGL
	UB	88125	DLDRN	KK8		0.771	UGL

USER NO.	ORG.	SAMPLE DATE	ANALYTE	MTH NO.	BL	CONC.	UOM
PWDW02	UB	88258	DLDRN	KK8		0.396	UGL
	UB	88125	ENDRN	KK8	LT	0.050	UGL
	UB	88258	ENDRN	KK8	LT	0.050	UGL
	UB	88258	F	HH8A		1.960	MGL
PWDW03	UB	88125	ALDRN	KK8	LT	0.050	UGL
	UB	88258	ALDRN	KK8	LT	0.050	UGL
	UB	88258	CL	HH8A		290	MGL
	UB	88125	CPMS	AAA8	LT	5.690	UGL
	UB	88125	CPMSO	AAA8	LT	11.500	UGL
	UB	88125	CPMSO2	AAA8	LT	7.460	UGL
	UB	88125	DBCP	AY8	LT	0.195	UGL
	UB	88125	DCPD	P8	LT	5.000	UGL
	UB	88258	DCPD	P8	LT	5.000	UGL
	UB	88125	DIMP	AW8A		1.800	UGL
	UB	88258	DIMP	AW8A		2.000	UGL
	UB	88125	DLDRN	KK8		0.707	UGL
	UB	88258	DLDRN	KK8		0.387	UGL
	UB	88125	ENDRN	KK8	LT	0.050	UGL
	UB	88258	ENDRN	KK8	LT	0.050	UGL
	UB	88258	F	HH8A		2.420	MGL
PWDW04	UB	88139	ALDRN	KK8	LT	0.050	UGL
	UB	88258	ALDRN	KK8	LT	0.050	UGL
	UB	88139	CL	HH8A		380	MGL
	UB	88258	CL	HH8A		360	MGL
	UB	88139	CPMS	AAA8	LT	5.690	UGL
	UB	88139	CPMSO	AAA8	LT	11.500	UGL
	UB	88139	CPMSO2	AAA8	LT	7.460	UGL
	UB	88139	DBCP	AY8	LT	0.195	UGL
	UB	88139	DCPD	P8	LT	5.000	UGL

USER NO.	ORG.	SAMPLE DATE	ANALYTE	MTH NO.	BL	CONC.	UOM
PWDW04	UB	88258	DCPD	P8	LT	5.000	UGL
	UB	88139	DIMP	AW8A		1.890	UGL
	UB	88258	DIMP	AW8A		3.860	UGL
	UB	88139	DLDRN	KK8		0.413	UGL
	UB	88258	DLDRN	KK8		0.234	UGL
	UB	88139	ENDRN	KK8	LT	0.050	UGL
	UB	88258	ENDRN	KK8	LT	0.050	UGL
	UB	88139	F	HH8A		2.080	MGL
	UB	88258	F	HH8A		2.670	MGL
PWDW05	UB	88146	ALDRN	KK8	LT	0.050	UGL
	UB	88265	ALDRN	KK8	LT	0.050	UGL
	UB	88146	CL	HH8A		310	MGL
	UB	88265	CL	HH8A		410	MGL
	UB	88146	CPMS	AAA8	LT	5.690	UGL
	UB	88265	CPMS	AAA8	LT	5.690	UGL
	UB	88146	CPMSO	AAA8	LT	11.500	UGL
	UB	88265	CPMSO	AAA8	LT	11.500	UGL
	UB	88146	CPMSO2	AAA8	LT	7.460	UGL
	UB	88265	CPMSO2	AAA8	LT	7.460	UGL
	UB	88146	DBCP	AY8	LT	0.195	UGL
	UB	88265	DBCP	AY8	LT	0.195	UGL
	UB	88146	DCPD	P8	LT	5.000	UGL
	UB	88146	DIMP	AW8A		3.350	UGL
	UB	88146	DLDRN	KK8		0.347	UGL
	UB	88265	DLDRN	KK8		0.480	UGL
	UB	88146	ENDRN	KK8	LT	0.050	UGL
	UB	88265	ENDRN	KK8	LT	0.050	UGL
	UB	88146	F	HH8A		2.670	MGL
	UB	88265	F	HH8A		2.390	MGL
PWDW06	UB	88146	ALDRN	KK8	LT	0.050	UGL
	UB	88265	ALDRN	KK8	LT	0.050	UGL
	UB	88146	CL	HH8A		330	MGL

USER NO.	ORG.	SAMPLE DATE	ANALYTE	MTH NO.	BL	CONC.	UOM
PWDW06	UB	88265	CL	HH8A		390	MGL
	UB	88146	CPMS	AAA8	LT	5.690	UGL
	UB	88265	CPMS	AAA8	LT	5.690	UGL
	UB	88146	CPMSO	AAA8	LT	11.500	UGL
	UB	88265	CPMSO	AAA8	LT	11.500	UGL
	UB	88146	CPMSO2	AAA8	LT	7.460	UGL
	UB	88265	CPMSO2	AAA8	LT	7.460	UGL
	UB	88146	DBCP	AY8	LT	0.195	UGL
	UB	88265	DBCP	AY8	LT	0.195	UGL
	UB	88146	DCPD	P8	LT	5.000	UGL
	UB	88146	DIMP	AW8A		5.540	UGL
	UB	88265	DIMP	AW8A		4.500	UGL
	UB	88146	DLDRN	KK8		0.055	UGL
	UB	88265	DLDRN	KK8	LT	0.050	UGL
	UB	88146	ENDRN	KK8	LT	0.050	UGL
	UB	88265	ENDRN	KK8		0.077	UGL
	UB	88146	F	HH8A		2.590	MGL
	UB	88265	F	HH8A		2.440	MGL
PWDW07	UB	88153	ALDRN	KK8	LT	0.050	UGL
	UB	88153	CL	HH8A		340	MGL
	UB	88153	CPMS	AAA8	LT	5.690	UGL
	UB	88153	CPMSO	AAA8	LT	11.500	UGL
	UB	88153	CPMSO2	AAA8	LT	7.460	UGL
	UB	88153	DCPD	P8	LT	5.000	UGL
	UB	88153	DIMP	AW8A		3.550	UGL
	UB	88153	DLDRN	KK8		0.181	UGL
	UB	88153	ENDRN	KK8	LT	0.050	UGL
	UB	88153	F	HH8A		2.950	MGL
PWDW08	UB	88153	ALDRN	KK8	LT	0.050	UGL

USER NO.	ORG.	SAMPLE DATE	ANALYTE	MTH NO.	BL	CONC.	UOM
PWDW08	UB	88153	CL	HH8A		400	MGL
	UB	88153	CPMS	AAA8	LT	5.690	UGL
	UB	88153	CPMSO	AAA8	LT	11.500	UGL
	UB	88153	CPMSO2	AAA8	LT	7.460	UGL
	UB	88153	DCPD	P8	LT	5.000	UGL
	UB	88153	DIMP	AW8A		3.490	UGL
	UB	88153	DLDRN	KK8		0.072	UGL
	UB	88153	ENDRN	KK8	LT	0.050	UGL
	UB	88153	F	HH8A		2.650	MGL
PWDW09	UB	88160	ALDRN	KK8	LT	0.050	UGL
	UB	88160	CL	HH8A		330	MGL
	UB	88160	CPMS	AAA8	LT	5.690	UGL
	UB	88160	CPMSO	AAA8	LT	11.500	UGL
	UB	88160	CPMSO2	AAA8	LT	7.460	UGL
	UB	88160	DBCP	AY8	LT	0.195	UGL
	UB	88160	DCPD	P8	LT	5.000	UGL
	UB	88160	DIMP	AW8A		2.240	UGL
	UB	88160	DLDRN	KK8	LT	0.050	UGL
	UB	88160	ENDRN	KK8	LT	0.050	UGL
	UB	88160	F	HH8A		2.360	MGL
PWDW10	UB	88160	ALDRN	KK8	LT	0.050	UGL
	UB	88160	CL	HH8A		330	MGL
	UB	88160	CPMS	AAA8	LT	5.690	UGL
	UB	88160	CPMSO	AAA8	LT	11.500	UGL

USER NO.	ORG.	SAMPLE DATE	ANALYTE	MTH NO.	BL	CONC.	UOM
PWDW10	UB	88160	CPMSO2	AAA8	LT	7.460	UGL
	UB	88160	DBCP	AY8	LT	0.195	UGL
	UB	88160	DCPD	P8	LT	5.000	UGL
	UB	88160	DIMP	AW8A		3.460	UGL
	UB	88160	LLDRN	KK8		0.076	UGL
	UB	88160	ENDRN	KK8	LT	0.050	UGL
	UB	88160	F	HH8A		2.380	MGL
PWDW11	UB	88167	ALDRN	KK8	LT	0.050	UGL
	UB	88167	CL	HH8A		320	MGL
	UB	88167	CPMS	AAA8	LT	5.690	UGL
	UB	88167	CPMSO	AAA3	LT	11.500	UGL
	UB	88167	CPMSO2	AAA8	LT	7.460	UGL
	UB	88167	DBCP	AY8	LT	0.195	UGL
	UB	88167	DCPD	P8	LT	5.000	UGL
	UB	88167	DIMP	AW8A		4.220	UGL
	UB	88167	DLDRN	KK8		0.372	UGL
	UB	88167	ENDRN	KK8	LT	0.050	UGL
	UB	88167	F	HH8A		2.640	MGL
PWDW12	UB	88167	ALDRN	KK8	LT	0.050	UGL
	UB	88167	CL	HH8A		510	MGL
	UB	88167	CPMS	AAA8	LT	5.690	UGL
	UB	88167	CPMSO	AAA8	LT	11.500	UGL
	UB	88167	CPMSO2	AAA8	LT	7.460	UGL
	UB	88167	DBCP	AY8	LT	0.195	UGL

USER NO.	ORG.	SAMPLE DATE	ANALYTE	MTH NO.	BL	CONC.	UOM
PWDW12	UB	88167	DCPD	P8	LT	5.000	UGL
	UB	88167	DIMP	AW8A		10.500	UGL
	UB	88167	DLDRN	KK8		1.200	UGL
	UB	88167	ENDRN	KK8	LT	0.050	UGL
	UB	88167	F	HH8A		3.200	MGL
PWDW13	UB	88174	ALDRN	KK8		0.097	UGL
	UB	88174	CL	HH8A		770	MGL
	UB	88174	CPMS	AAA8	LT	5.690	UGL
	UB	88174	CPMSO	AAA8	LT	11.500	UGL
	UB	88174	CPMSO2	AAA8	LT	7.460	UGL
	UB	88174	DBCP	AY8	LT	0.195	UGL
	UB	88174	DCPD	P8	LT	5.000	UGL
	UB	88174	DIMP	AW8A		18.900	UGL
	UB	88174	DLDRN	KK8		0.756	UGL
	UB	88174	ENDRN	KK8		0.054	UGL
	UB	88174	F	HH8A		3.760	MGL
PWDW14	UB	88174	ALDRN	KK8		0.143	UGL
	UB	88174	CL	HH8A		900	MGL
	UB	88174	CPMS	AAA8	LT	5.690	UGL
	UB	88174	CPMSO	AAA8	LT	11.500	UGL
	UB	88174	CPMSO2	AAA8	LT	7.460	UGL
	UB	88174	DBCP	AY8		0.209	UGL
	UB	88174	DCPD	P8	LT	5.000	UGL
	UB	88174	DIMP	AW8A		23.500	UGL

USER NO.	ORG.	SAMPLE DATE	ANALYTE	MTH NO.	BL	CONC.	UOM
PWDW14	UB	88174	DLDRN	KK8		0.596	UGL
	UB	88174	ENDRN	KK8	LT	0.050	UGL
	UB	88174	F	HH8A		3.940	MGL
PWDW15	UB	88174	ALDRN	KK8		0.124	UGL
	UB	88174	CL	HH8A		820	MGL
	UB	88174	CPMS	AAA8	LT	5.690	UGL
	UB	88174	CPMSO	AAA8	LT	11.500	UGL
	UB	88174	CPMSO2	AAA8	LT	7.460	UGL
	UB	88174	DBCP	AY8	LT	0.195	UGL
	UB	88174	DCPD	P8	LT	5.000	UGL
	UB	88174	DIMP	AW8A		7.110	UGL
	UB	88174	DLDRN	KK8		0.495	UGL
	UB	88174	ENDRN	KK8	LT	0.050	UGL
	UB	88174	F	HH8A		4.360	MGL

09/25/89
R.I.C.

FY 88 STATISTICAL SUMMARY
NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: ALDRN
CERTIFIED REPORTING LIMIT (LT): 0.05

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	UOM	MEAN	LOW VALUE	HIGH VALUE
1	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
2	2	1	50%	UGL	*	LT CRL	0.062
3	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
4	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
5	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
6	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
7	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
8	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
9	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
10	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
11	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
12	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
13	1	1	100%	UGL	0.097	0.097	0.097
14	1	1	100%	UGL	0.143	0.143	0.143
15	1	1	100%	UGL	0.124	0.124	0.124

09/25/89
R.I.C.

FY 88 STATISTICAL SUMMARY
NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: CHLORIDE
CERTIFIED REPORTING LIMIT (LT): 0.72

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	UOM	MEAN	LOW VALUE	HIGH VALUE
1	2	2	100%	MGL	260.000	250.000	270.000
2	1	1	100%	MGL	220.000	220.000	220.000
3	1	1	100%	MGL	290.000	290.000	290.000
4	2	2	100%	MGL	370.000	360.000	380.000
5	2	2	100%	MGL	360.000	310.000	410.000
6	2	2	100%	MGL	360.000	330.000	390.000
7	1	1	100%	MGL	340.000	340.000	340.000
8	1	1	100%	MGL	400.000	400.000	400.000
9	1	1	100%	MGL	330.000	330.000	330.000
10	1	1	100%	MGL	330.000	330.000	330.000
11	1	1	100%	MGL	320.000	320.000	320.000
12	1	1	100%	MGL	510.000	510.000	510.000
13	1	1	100%	MGL	770.000	770.000	770.000
14	1	1	100%	MGL	900.000	900.000	900.000
15	1	1	100%	MGL	820.000	820.000	820.000

09/25/89
R.I.C.

FY 88 STATISTICAL SUMMARY
NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: COMB. ORGANO-SULFUR
CERTIFIED REPORTING LIMIT (LT): 24.65

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	UOM	MEAN	LOW VALUE	HIGH VALUE
1	1	0	0%		LT CRL	LT CRL	LT CRL
2	1	0	0%		LT CRL	LT CRL	LT CRL
3	1	0	0%		LT CRL	LT CRL	LT CRL
4	1	0	0%		LT CRL	LT CRL	LT CRL
5	2	0	0%		LT CRL	LT CRL	LT CRL
6	2	0	0%		LT CRL	LT CRL	LT CRL
7	1	0	0%		LT CRL	LT CRL	LT CRL
8	1	0	0%		LT CRL	LT CRL	LT CRL
9	1	0	0%		LT CRL	LT CRL	LT CRL
10	1	0	0%		LT CRL	LT CRL	LT CRL
11	1	0	0%		LT CRL	LT CRL	LT CRL
12	1	0	0%		LT CRL	LT CRL	LT CRL
13	1	0	0%		LT CRL	LT CRL	LT CRL
14	1	0	0%		LT CRL	LT CRL	LT CRL
15	1	0	0%		LT CRL	LT CRL	LT CRL

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R.I.C.

FY 88 STATISTICAL SUMMARY
NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: DBCP
CERTIFIED REPORTING LIMIT (LT): 0.195

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	UOM	MEAN	LOW VALUE	HIGH VALUE
1	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
2	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
3	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
4	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
5	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
6	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
9	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
10	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
11	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
12	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
13	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
14	1	1	100%	UGL	0.209	0.209	0.209
15	1	0	0%	UGL	LT CRL	LT CRL	LT CRL

09/25/89
R.I.C.

FY 88 STATISTICAL SUMMARY
NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: DCPD
CERTIFIED REPORTING LIMIT (LT): 5.0

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	UOM	MEAN	LOW VALUE	HIGH VALUE
1	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
2	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
3	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
4	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
5	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
6	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
7	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
8	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
9	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
10	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
11	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
12	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
13	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
14	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
15	1	0	0%	UGL	LT CRL	LT CRL	LT CRL

09/25/89
R.I.C.

FY 88 STATISTICAL SUMMARY
NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: DIMP
CERTIFIED REPORTING LIMIT (LT): 0.65

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	UOM	MEAN	LOW VALUE	HIGH VALUE
1	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
2	2	2	100%	UGL	1.146	0.961	1.330
3	2	2	100%	UGL	1.900	1.800	2.000
4	2	2	100%	UGL	2.875	1.890	3.860
5	1	1	100%	UGL	3.350	3.350	3.350
6	2	2	100%	UGL	5.020	4.500	5.540
7	1	1	100%	UGL	3.550	3.550	3.550
8	1	1	100%	UGL	3.490	3.490	3.490
9	1	1	100%	UGL	2.240	2.240	2.240
10	1	1	100%	UGL	3.460	3.460	3.460
11	1	1	100%	UGL	4.220	4.220	4.220
12	1	1	100%	UGL	10.500	10.500	10.500
13	1	1	100%	UGL	18.900	18.900	18.900
14	1	1	100%	UGL	23.500	23.500	23.500
15	1	1	100%	UGL	7.110	7.110	7.110

09/25/89
R.I.C.

FY 88 STATISTICAL SUMMARY
NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: DLDRN
CERTIFIED REPORTING LIMIT (LT): 0.05

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	UOM	MEAN	LOW VALUE	HIGH VALUE
1	2	2	100%	UGL	0.278	0.258	0.297
2	2	2	100%	UGL	0.584	0.396	0.771
3	2	2	100%	UGL	0.547	0.387	0.707
4	2	2	100%	UGL	0.324	0.234	0.413
5	2	2	100%	UGL	0.414	0.347	0.480
6	2	1	50%	UGL	*	LT CRL	0.055
7	1	1	100%	UGL	0.181	0.181	0.181
8	1	1	100%	UGL	0.072	0.072	0.072
9	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
10	1	1	100%	UGL	0.076	0.076	0.076
11	1	1	100%	UGL	0.372	0.372	0.372
12	1	1	100%	UGL	1.200	1.200	1.200
13	1	1	100%	UGL	0.756	0.756	0.756
14	1	1	100%	UGL	0.596	0.596	0.596
15	1	1	100%	UGL	0.495	0.495	0.495

09/25/89
R.I.C.

FY 88 STATISTICAL SUMMARY
NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: ENDRN
CERTIFIED REPORTING LIMIT (LT): 0.05

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	UOM	MEAN	LOW VALUE	HIGH VALUE
1	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
2	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
3	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
4	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
5	2	0	0%	UGL	LT CRL	LT CRL	LT CRL
6	2	1	50%	UGL	*	LT CRL	0.077
7	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
8	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
9	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
10	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
11	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
12	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
13	1	1	100%	UGL	0.054	0.054	0.054
14	1	0	0%	UGL	LT CRL	LT CRL	LT CRL
15	1	0	0%	UGL	LT CRL	LT CRL	LT CRL

09/25/89
R.I.C.

FY 88 STATISTICAL SUMMARY
NORTHWEST BOUNDARY DEWATERING WELLS

ANALYTE: FLUORIDE
CERTIFIED REPORTING LIMIT (LT): 0.482

WELL NO.	TOT SAMP	SAMP >CRL	% > CRL	UOM	MEAN	LOW VALUE	HIGH VALUE
1	2	2	100%	MGL	1.585	1.470	1.700
2	1	1	100%	MGL	1.960	1.960	1.960
3	1	1	100%	MGL	2.420	2.420	2.420
4	2	2	100%	MGL	2.375	2.080	2.670
5	2	2	100%	MGL	2.530	2.390	2.670
6	2	2	100%	MGL	2.515	2.440	2.590
7	1	1	100%	MGL	2.950	2.950	2.950
8	1	1	100%	MGL	2.650	2.650	2.650
9	1	1	100%	MGL	2.360	2.360	2.360
10	1	1	100%	MGL	2.380	2.380	2.380
11	1	1	100%	MGL	2.640	2.640	2.640
12	1	1	100%	MGL	3.200	3.200	3.200
13	1	1	100%	MGL	3.760	3.760	3.760
14	1	1	100%	MGL	3.940	3.940	3.940
15	1	1	100%	MGL	4.360	4.360	4.360